



Harris County Multi-Agency Coordinating Group Gap Analysis

Prepared for Harris County, Texas by PENTA Consortium, LLC
July, 2019

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Executive Summary

History:

On April 9, 2019, Harris County Commissioners Court approved a contract with PENTA Consortium, LLC (“PENTA”) to develop a comprehensive Multi-Agency Coordinating Group Gap Analysis (“Gap Analysis”) in order to identify important gaps in the County’s capacity to prevent, prepare for, and respond to incidents like the fire and HazMat incident that occurred at the Intercontinental Terminals Company (ITC) facility in March, 2019. This incident is officially known as the “Second 80’s Incident.”

In developing this Gap Analysis, PENTA explored many different initiatives that could protect the County in the face of emergency incidents. PENTA assessed refining and chemical plant operators and contractors, interviewed the Harris County departments that play a major role in emergency response, engaged local law enforcement agencies, and solicited input from external organizations and community stakeholders.

Background:

Harris County is the third most populous county in the United States. With a population of 4,092,459 (according to the 2010 census), Harris County is more populous than 23 other states. According to the County’s 2019 budget, there are now over 2,000,000 residents within the unincorporated areas of Harris County. If the unincorporated areas were an independent city, it would be the second largest city in Texas, fifth largest city in the nation, and larger than 14 other states.

Harris County comprises 1,777 square miles, making it larger than the State of Rhode Island. In addition to being home to Houston, the fourth largest city in the nation, Harris County is also the center of the largest petrochemical complex in the Western Hemisphere (second worldwide only to Rotterdam in The Netherlands). With almost 10,000 miles of pipeline, Harris County has more pipelines than any other county, parish, or borough in the United States and over 1.7 million County residents live within half a mile of these pipelines. This is also the only region in the nation where all 16 of the Department of Homeland Security’s “Critical Infrastructure Sectors” can be found.

There are 34 incorporated cities within Harris County. There are 54 fire departments. Between federal, state, and local governments, there are over 150 law enforcement agencies that operate within Harris County. Obviously, it takes a significant amount of coordination and interagency partnering to ensure effective interoperability.

Comparing Harris County to any other county in the United States, or even to many of the states, is a complex endeavor. Harris County is unique, requiring equally unique solutions to enhance preparedness.

Harris County has repeatedly demonstrated that the first responders, emergency managers, and support staff that comprise the emergency response and management capabilities in the area are adaptable, innovative, and mission oriented. An “All-Threats, All-Hazards, Always Ready” ethos binds federal, state, local, private sector, and non-governmental organizations together before, during, and after an incident. The world-

renowned Texas “can do” spirit has enabled this area to continually rise to challenges wrought by mother nature (examples include Hurricanes Harvey and Ike, Tropical Storm Allison, and major rain events like the Memorial Day Floods) as well as those posed by the petrochemical industry. This region is a practiced, well-oiled machine; yet the people who lead this well-oiled machine know they can always do better. They strive to avoid complacency and are committed to embracing new and emerging technologies.

This Gap Analysis was conducted with all of this in mind. It was intended to take an honest look at plans, training and competencies, resources, capabilities, and facilities; to review where the County currently stands and where it needs to be to ensure the safety and security of residents; and how to effectively share accurate, timely, and vetted information with decision makers in order to keep stakeholders informed.

Key Findings from Hazard Identification and Risk Analysis

Hazardous materials are not limited to a specific area of Harris County. Between the highway transportation routes, multiple rail lines, thousands of miles of pipelines, the Port of Houston, 2,927 chemical facilities reporting under the Emergency Planning and Community Right to Know Act, not to mention scores of enormous warehouses, significant quantities of hazardous materials can be found throughout the County in each of the four Commissioner’s Precincts.

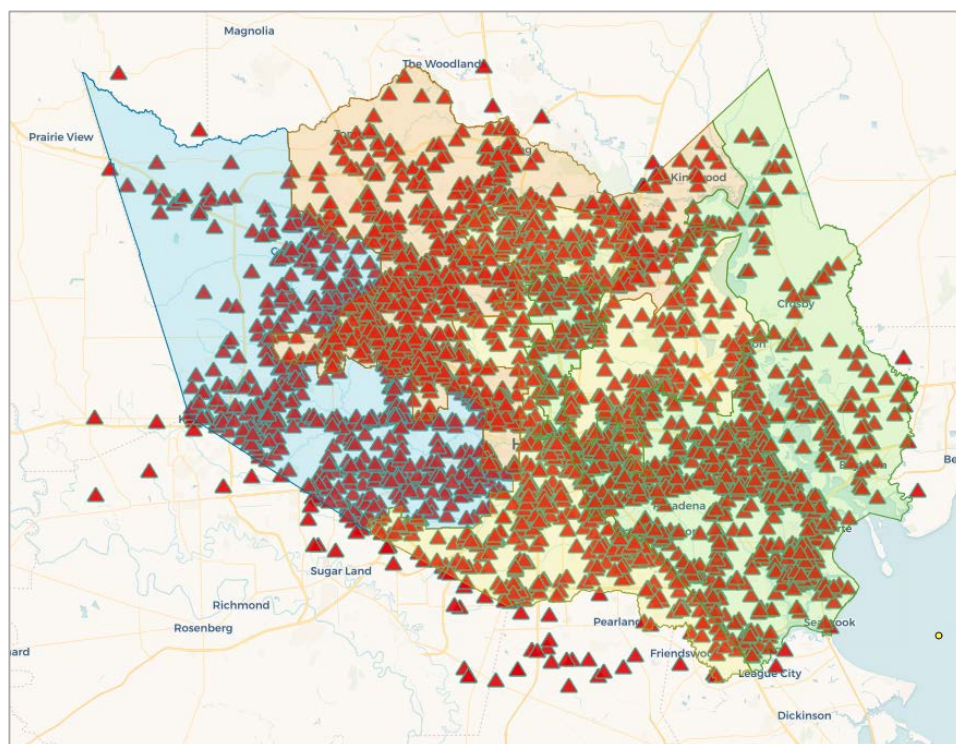


Figure 1. 2,927 chemical facilities reporting under the Emergency Planning and Community Right to Know Act displayed in Harris County's Atlas Mapping System. Note how these facilities are located in each of the four Commissioner's Precincts.

The Hazard Analysis portion of this Gap Analysis confirms what many experienced first responders already know - the Tier 2 data available under the Emergency Planning and Community Right to Know Act (SARA Title III) has limited value due to its format (a once-a-year snapshot of what is stored at a facility on a certain day). A significant portion of the information was also found to have glaring inaccuracies, which would need to be properly addressed to enhance the usefulness of the data. Site visits would be a primary means of improving the accuracy of this information, but that will require additional resources. Further, as the County with more active pipelines than any other in the United States, Harris County needs to ensure accurate situational awareness of pipeline routes, control stations, and products carried. This too will require additional resources.

Key Findings from Departmental Assessments

The Harris County Office of Homeland Security and Emergency Management (HCOHSEM) is recognized throughout the nation as one of the premier emergency management organizations. People from around the world visit TranStar annually to see how emergencies are managed in Harris County. This is something that Harris County should be justifiably proud of. As firm believers in continuous quality improvement, the personnel comprising this department are always seeking means to improve the quality of their services. Ensuring that the Emergency Operations Center is staffed with trained and capable personnel from inside and outside their department is a critical key to success. Improving the understanding and relationship with the private sector, particularly the oil and gas, chemical, and energy sectors that comprise the largest petrochemical complex in the Western Hemisphere, is also critical. Detailing an effective process on how best to transition from an emergency response phase to a long-term recovery phase is another key to improvement. As the emergency management subject matter experts, the HCOHSEM is cognizant of the importance of training, not only for the department, but for other County agencies and elected leadership. Encouraging greater participation in training programs, many provided at no cost by the State of Texas, will improve County readiness and capabilities. Being the champions for active participation within a Unified Command is crucial to ensure that local authorities having jurisdiction have a voice in the management and direction of incidents that happen within their area of responsibility. Finally, determining a standardized means to best convey a Common Operational Picture from an Incident Command Post to the Emergency Operations Center to elected leadership will ensure situational awareness and better enable emergency managers to more effectively inform the residents of Harris County.

Along with other Harris County law enforcement agencies, the Harris County Fire Marshal's Office (HCFMO) are some of the most visible responders in the eyes of the residents. The HCFMO Hazardous Materials Response Team has a nationwide reputation and is often consulted by peers across the country to share their knowledge and skills. They recognize that plans need constant updating, more so than just annual updating. They need to incorporate best practices and lessons learned from After-Action Reviews. Because of their skills with the National Incident Management System and active interagency relationships, they should partner with the Harris County Office of Homeland Security and Emergency Management in championing the need for more

active participation within a Unified Command to ensure that local authorities having jurisdiction have a voice in the management and direction of incidents that happen within their area of responsibility. Ensuring personnel are trained, resourced with equipment, and capable of addressing current and emerging threats is paramount to the safety and security of the residents of Harris County, and addressing internal needs is a critical first step. Helping other agencies improve their capabilities is a critical follow-on step. Both will require the commitment of resources to be successful. Obtaining the resources (personnel and apparatus) as well as a support facility in western Harris County will go a long way to effectively addressing the safety and security needs of residents in those portions of the County.

Harris County Public Health (HCPH) is a nationally recognized local health department. In 2015, HCPH received the Project Public Health Ready certification, which focuses on public health preparedness planning, training, and exercise capabilities. Specifically in the area of emergency preparedness, response, and recovery, HCPH is sought out nationally and statewide for its expertise in public health emergencies. HCPH has also been nationally recognized for its work in community engagement, outreach, and infectious disease response. While HCPH lags behind in per capita local funding compared to many other local health departments within Texas, HCPH continues to strive for excellence in promoting a healthy and safe community for the residents of Harris County. This Gap Analysis noted significant overlapping duties and responsibilities during a chemical disaster response between HCPH and the Harris County Pollution Control Services Department. This is no doubt a result of the merger of these two departments from 1998-2011 and then a subsequent split in 2011. Although this division of Public Health and Pollution Control Services took place eight years ago, there remains some confusion/overlap between the roles of each department. Although Public Health focuses on the health and well-being of the Harris County residents and Pollution Control focuses on environmental impact when chemicals are released, there remains a need for both to work closely together during HazMat incidents. Dedicated efforts should be devoted to addressing actual or perceived duplication of effort. Further, HCPH's Emergency Operations Plan should include more detail on its role during a chemical response, something that the Harris County Office of Homeland Security and Emergency Management can likely assist with. Like many other organizations, the Harris County Public Health Department should also make better use of available training through PreparingTexas.org, the Harris County Fire Marshal's Office, and other sources. Most importantly, HCPH should support the Harris County Pollution Control Services in developing and implementing an effective Community Monitoring strategy to ensure the safety of County residents. This last improvement will require substantial resources (personnel and equipment), as well as training to build this capacity in a timely and effective manner.

The Harris County Pollution Control Services Department has experienced the greatest entropy in the last 21 years of all the departments analyzed. As with other departments, it is also in need of updates to their plans and standard operating procedures. The Harris County Office of Homeland Security and Emergency Management can provide the subject matter expertise needed to assist their peers in this endeavor. Harris County

Pollution Control Services also needs to take the lead in developing, implementing, and leading the effort to develop an effective Community Monitoring strategy capable of safeguarding the residents of Harris County. This will require substantial support for personnel, equipment and technology. As the most discussed gap from the Second 80's Incident, this should be their principle priority. Pollution Control Services also needs to work with the Harris County Fire Marshal's Office to minimize the perceived duplication of effort regarding emergency response.

County law enforcement organizations also received a cursory review as part of this Gap Analysis. It was determined that many are not as familiar with the Harris County Emergency Operations Plan as they should be. The Harris County Office of Homeland Security and Emergency Management should consider scheduling seminar-style exercises to provide an opportunity to enhance the knowledge of law enforcement leaders throughout Harris County. Law enforcement representatives also expressed a need for additional training in both the National Incident Management System and in hazardous materials response, both of which the Harris County Fire Marshal's Office can assist with if properly resourced. Finally, there is a need for appropriate personal protective equipment for officers in the field; this will have to be jointly addressed by these law enforcement agencies as well as the Harris County Fire Marshal's Office to determine what is needed and whether to issue the equipment, or stockpile the equipment for future contingency use.

Key Areas for Improvement

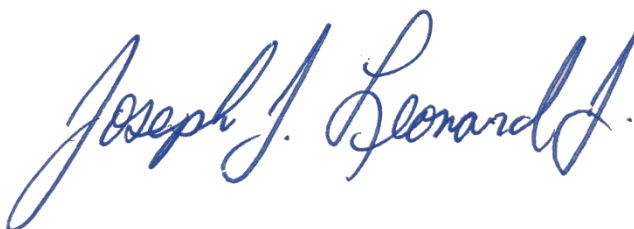
Three major areas for improvement were highlighted that impact multiple County departments:

1. Community Air/Soil/Surface Water Monitoring: Mentioned above and elsewhere in this Gap Analysis, a Community Monitoring Strategy is vital in order to safeguard the residents of Harris County. The County has highly effective capabilities to support tactical monitoring during the immediate response to incidents, but the capabilities focused outward (towards the community) are less robust and can be improved upon.
2. Improved Information Sharing: All departments and agencies surveyed should partner together to improve situational information sharing and to develop a common operational picture. There are currently multiple tools in use that are doing this; some are more effective than others. This can be improved upon. Perhaps not all entities will buy into a common system, but a dedicated effort can be exerted to get as many on board as possible.
3. Public Warning and Notifications: Similarly, public alerts, warning/notification, and the sharing of situational updates with the public is a shared responsibility that can be improved. During times of emergency, residents must receive clear and concise information that they can understand and act upon. This may also be another area where not every entity wants to participate in a common and effective system of sharing information. However, elected leaders and emergency managers should strive for maximum integration into an effective, streamlined system.

The last section of this report, titled “Final Analysis and Recommendations,” includes 49 recommendations for Harris County Commissioner’s Court, under the leadership of Judge Lina Hidalgo, to consider. 18 of these are listed as “Immediate,” which are defined as items that can be implemented within 45-90 days following submission of this report. These are recommendations that can be accomplished at little to no cost and at the direction of either the County Judge or select department heads. These recommendations can be used by Harris County Commissioners Court, department heads, the Harris County Sheriff, and Precinct Constables to demonstrate a definitive bias for action to proactively safeguard the residents of Harris County.

This report is intended to be a resource for Harris County to use as a roadmap to improve, become safer, and more resilient for the future of our residents.

Respectfully submitted,

A handwritten signature in blue ink that reads "Joseph J. Leonard, Jr." The signature is fluid and cursive, with the first and last names being more prominent.

JOSEPH J, LEONARD, JR., MEP, MCP, CEM, CHPP, CPE
Commander, US Coast Guard (retired)
Principal Consultant / Project Manager
PENTA Consortium, LLC

Hazard Identification and Risk Analysis

One method of identifying the potential chemical hazards in a community is utilizing the data provided by the Emergency Planning and Community Right-to-Know Act (EPCRA 302/304), passed in 1986. This law requires all facilities that handle, store or use chemicals above Threshold Planning Quantities (TPQs) to report this information to the state and local officials and the local fire department. This data is known as “Tier 2 Chemical Facility Reporting Data” and is required to be reported each year by March 1, detailing the products that were on site for the previous calendar year. The Hazard Identification and Risk Analysis in this report is based on the 2017 Tier 2 reporting year data provided to Harris County by the Texas Commission on Environmental Quality (TCEQ).

While these facilities are required to report, and can face significant fines (up to \$25,000/day for non-compliance), they are essentially on the “honor system” as there is no easy way to ensure that all facilities are reporting. Additionally, many facilities do not report complete and accurate information, as well as there may be warehouses that also store chemicals on a transient or temporary basis that do not report their chemical inventories. In some cases, the only way the County would become aware that they were storing chemicals would be if there was an incident at the location or if they happened upon these chemicals during pre-incident planning. Conducting pre-planning activities of warehouses could be a way to identify facilities that are warehousing chemicals that have not been reported.

One possible way to identify non-reporting Tier 2 facilities in the County would be to compare EPA permit numbers for other chemical reporting requirements, such as EPCRA 313, Toxic Release Inventory (TRI). TRI tracks the management of certain toxic chemicals that may pose a threat to human health and the environment. Facilities in designated industry sectors must report annually how much of each chemical is released into the environment and/or managed through recycling, energy recovery, and treatment. A “release” of a chemical means that it is emitted into the air or water or placed in some type of land disposal. The information submitted by facilities is compiled in the Toxic Release Inventory. TRI helps support informed decision-making by companies, government agencies, non-governmental organizations, and the public.

Another potential way to identify non-reporting Tier 2 facilities would be to compare facility records that report under Clean Air Act Section 112(r): Accidental Release Prevention/Risk Management Plan Rule. These regulations require companies of all sizes that use certain listed regulated flammable and toxic substances to develop a Risk Management Program, which includes a(n):

- Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental release scenarios;
- Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and

- Emergency response program that spells out emergency health care, employee training measures, and procedures for informing the public and response agencies (e.g. fire department) should an accident occur.

Facilities that meet one of the other reporting requirements that may not have reported under EPCRA 302/304 might have reported under one of these other standards. Cross referencing EPA Permit Numbers could provide clues about non-reporting facilities.

Reviewing the Tier 2 reporting data in the Harris County Atlas mapping system shows there are 2,927 facilities that have submitted chemical inventory reports for the 2017 reporting year.

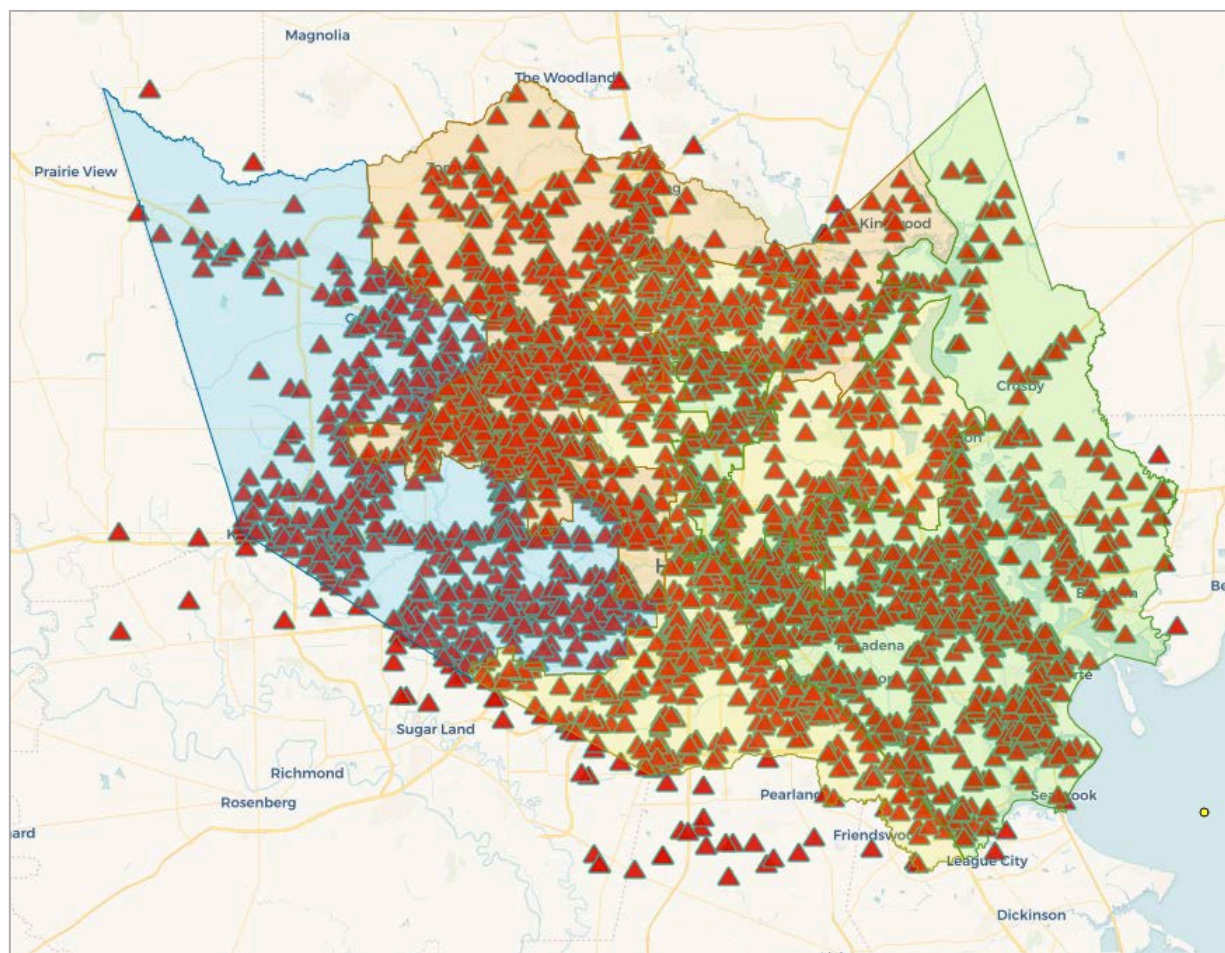


Figure 2. Harris County ATLAS mapping system showing the 2,927 Tier 2 reporting facilities.

Of these facilities 1,734 reported that they had Extremely Hazardous Substances (EHSs) on their site, for a total of 3,370 EHS chemical records.

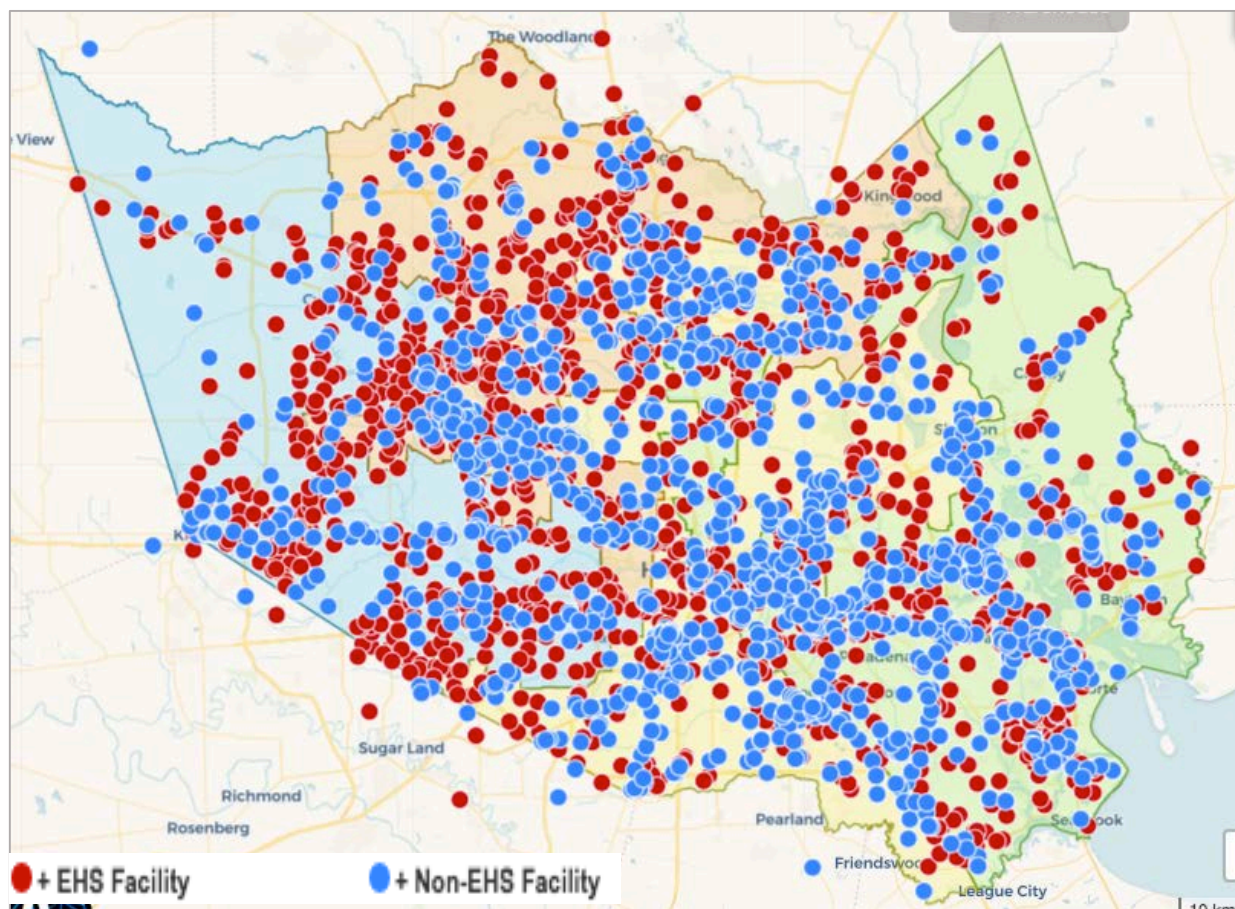


Figure 3. Harris County ATLAS mapping system showing 1,734 EHS Facilities vs. 1,193 Non- EHS Facilities.

Of the 1,734 EHS facilities, 635 reported having only one chemical on site and 708 reported having 2-5 chemicals on site.

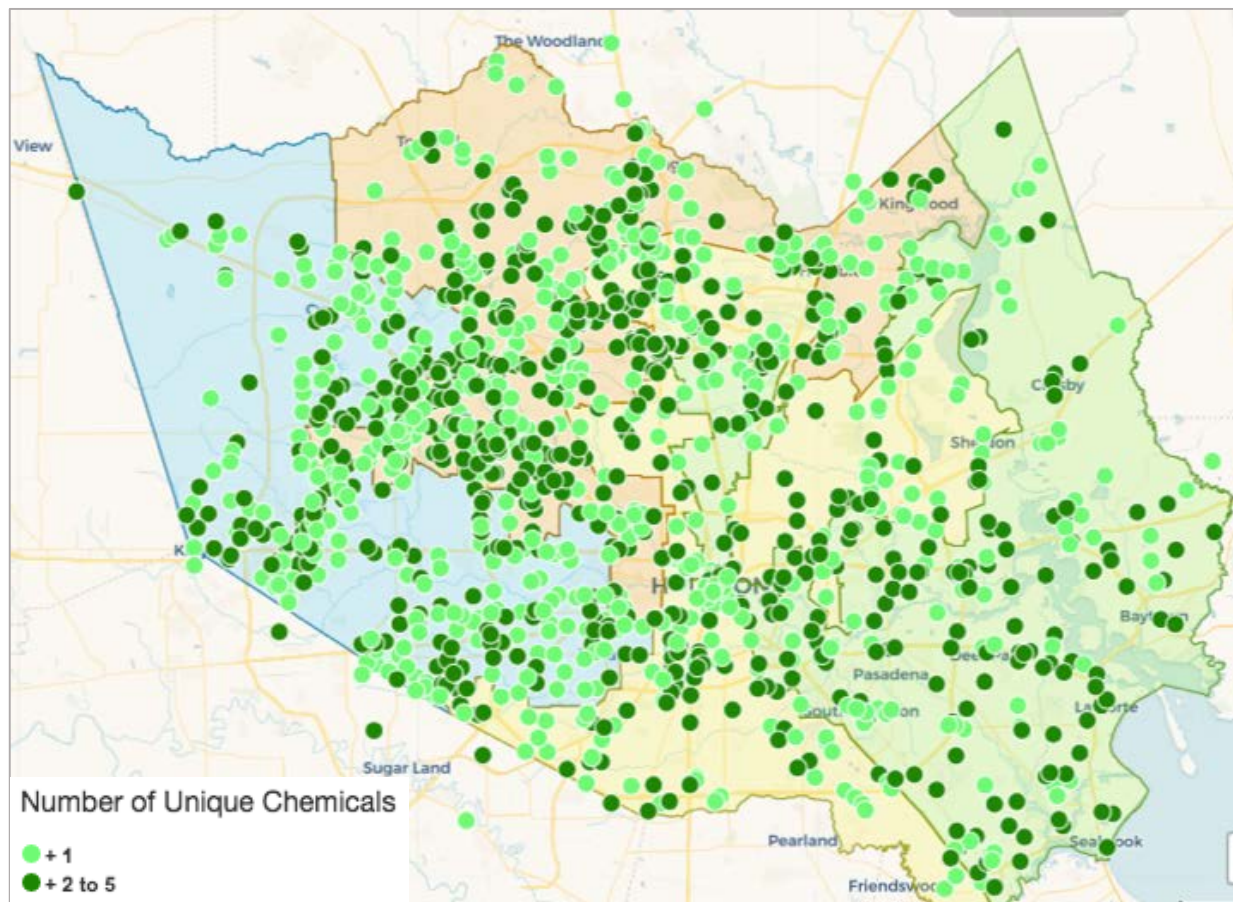


Figure 4. Harris County ATLAS Mapping System showing Facilities with only 1 chemical and 2-5 chemicals on site.

243 facilities reported having 6-20 chemicals on site and 102 reported having 21-50 chemicals on site.

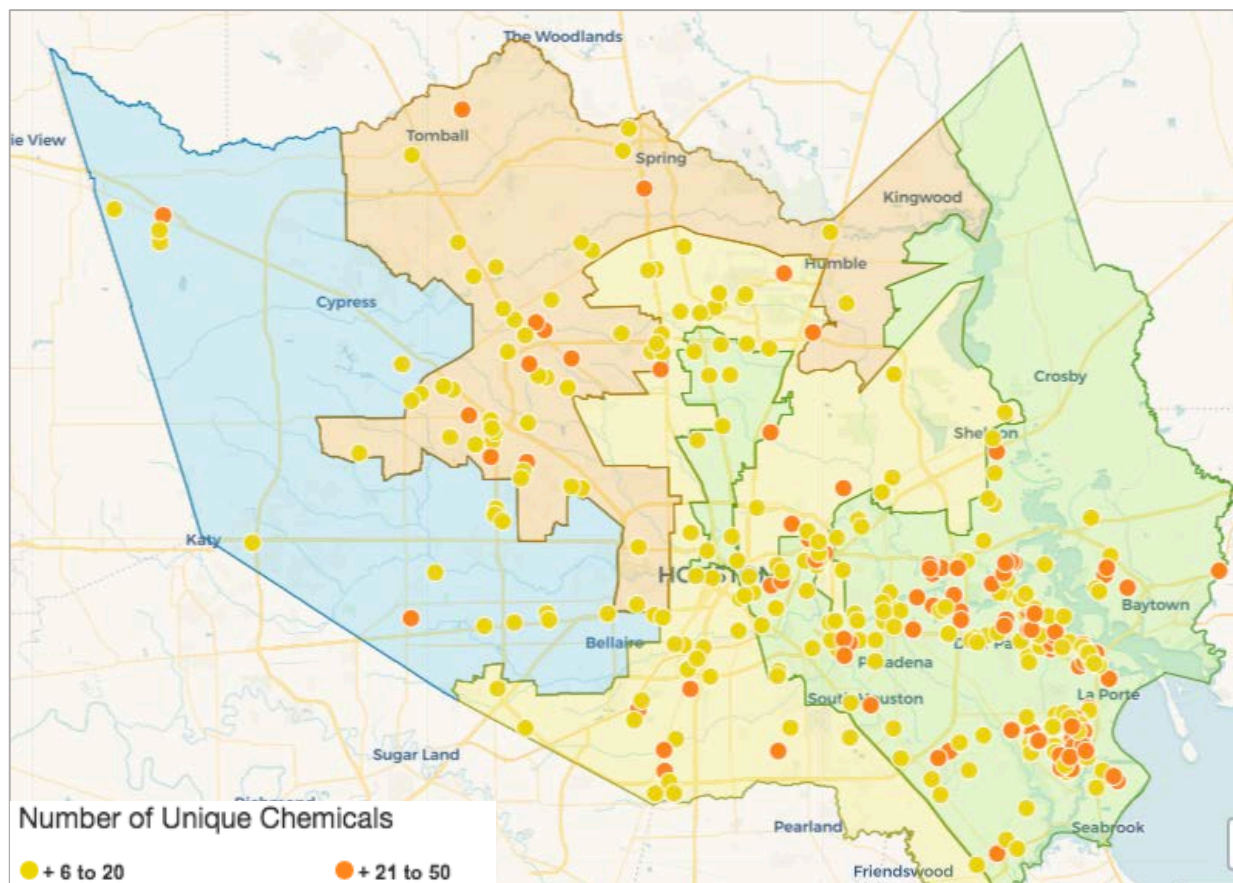


Figure 5. Harris County ATLAS mapping system showing 6-20 chemicals and 21-50 chemicals on site.

34 facilities reported having 51-100 chemicals on site and 12 reported having more than 101 chemicals on site.

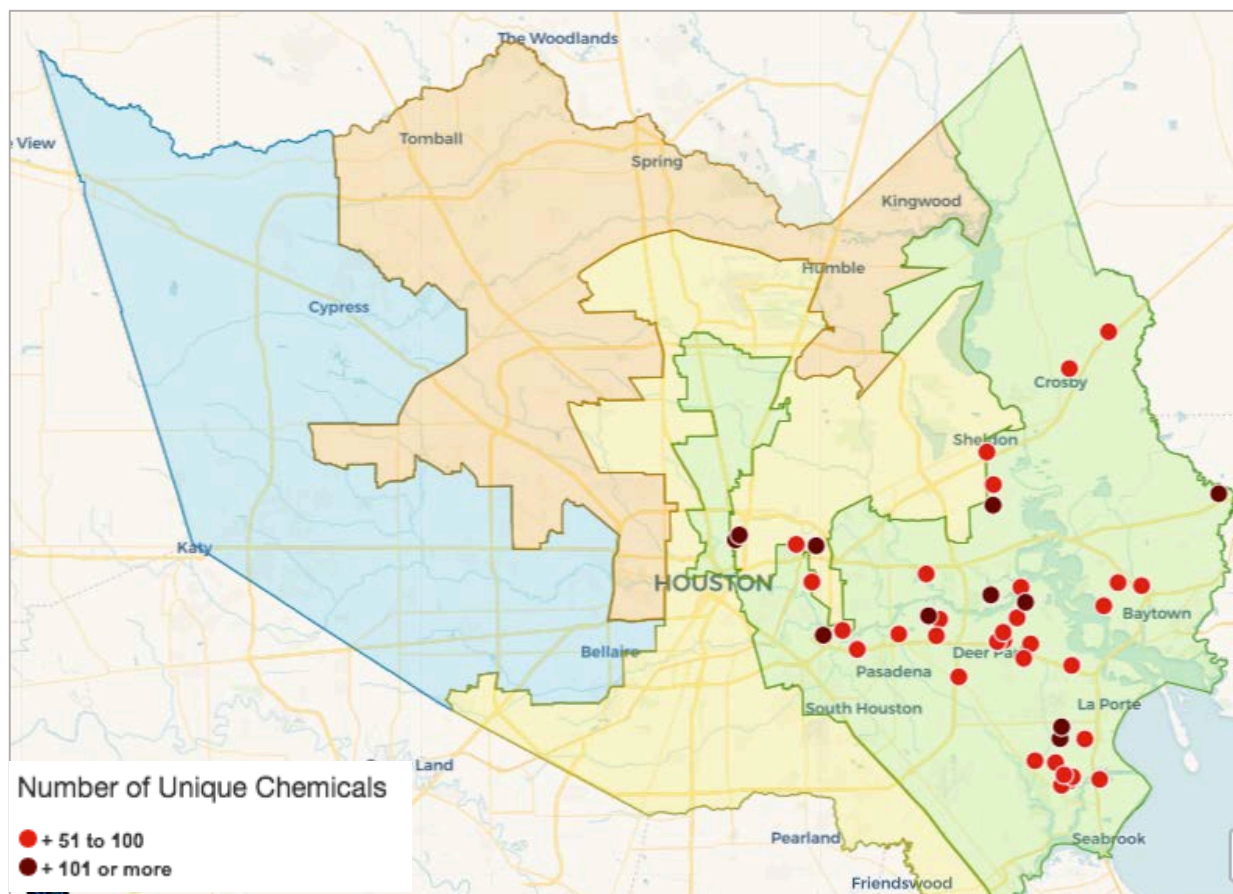


Figure 6. Harris County ATLAS mapping system showing 51 to 100 and 101 or more chemicals on site.

A review of the data revealed that there were some significant errors in the raw reporting data. Many chemicals were incorrectly identified as an EHS, and many others were not identified as an EHS and should have been. The EHS chemical record dataset was corrected to accurately reflect the number of EHS chemicals and facilities. After the correction, there were 1,669 facilities that have EHS chemicals on site and a corrected total of 2,853 EHS chemical records.

The reported chemicals that present the greatest risk to the communities surrounding the identified chemical facilities would primarily be toxic gases (including but not limited to such products as chlorine, ammonia, sulfur dioxide, hydrogen sulfide, hydrogen chloride) and can be found in containers and systems containing quantities ranging from 100 pound cylinders, one-ton containers, up to rail tank cars, and possibly even larger systems at the various identified facilities.

Based on the 2017 Tier 2 Chemical Facility reporting data, there are approximately 110 facilities that have reported chemical inventories of greater than 10 million pounds of hazardous chemicals, including Extremely Hazardous Substances (EHSs) and Flammable and Combustible products. Many of these are storage facilities/tank farms. Approximately 77,000 people live within one half mile of these facilities.

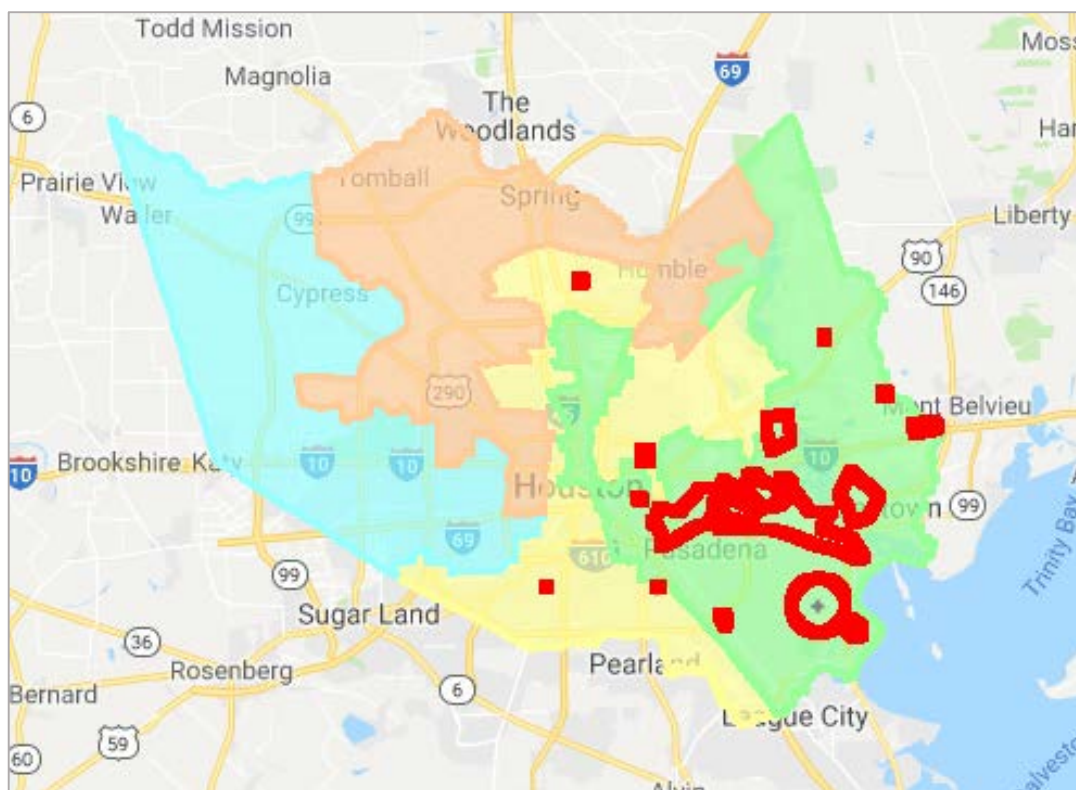


Figure 7. Tank farm reporting greater than 10 million pounds of hazardous chemicals.

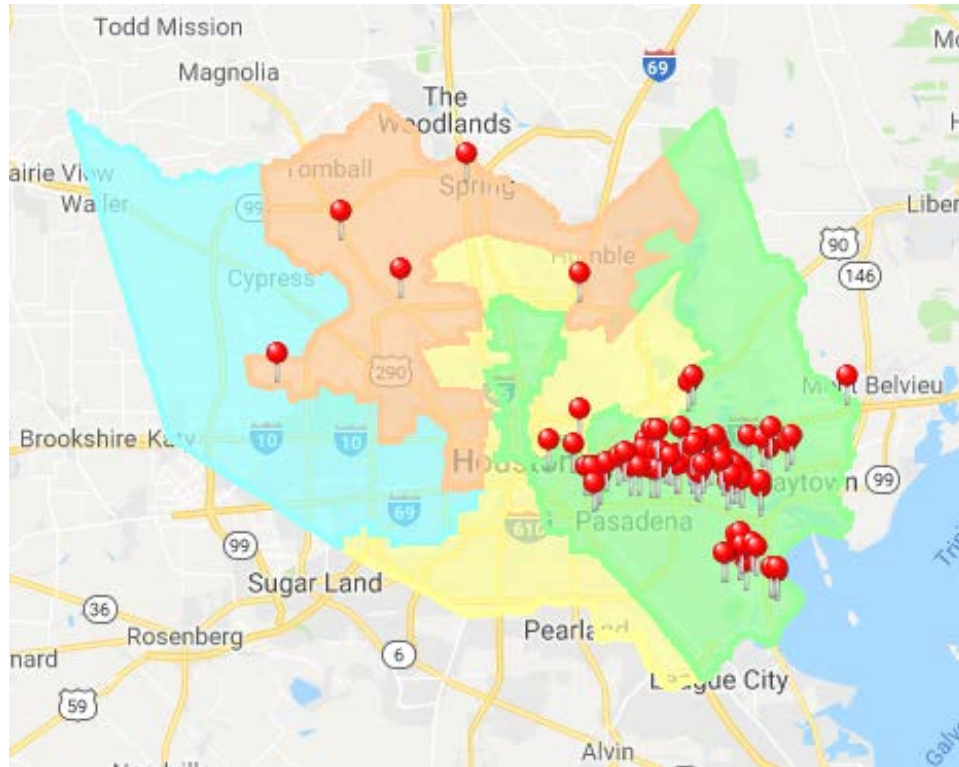


Figure 8. 86 EHS Facilities reporting greater than 10 million pounds of hazardous chemicals on site.

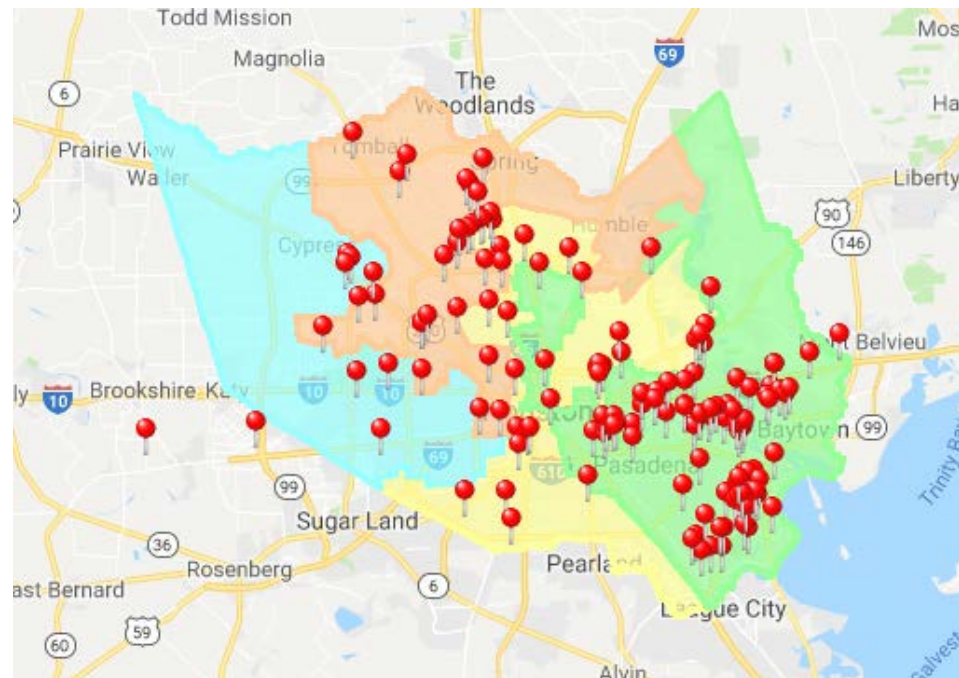


Figure 9. 145 Facilities reporting to have ammonia products in their chemical inventories.

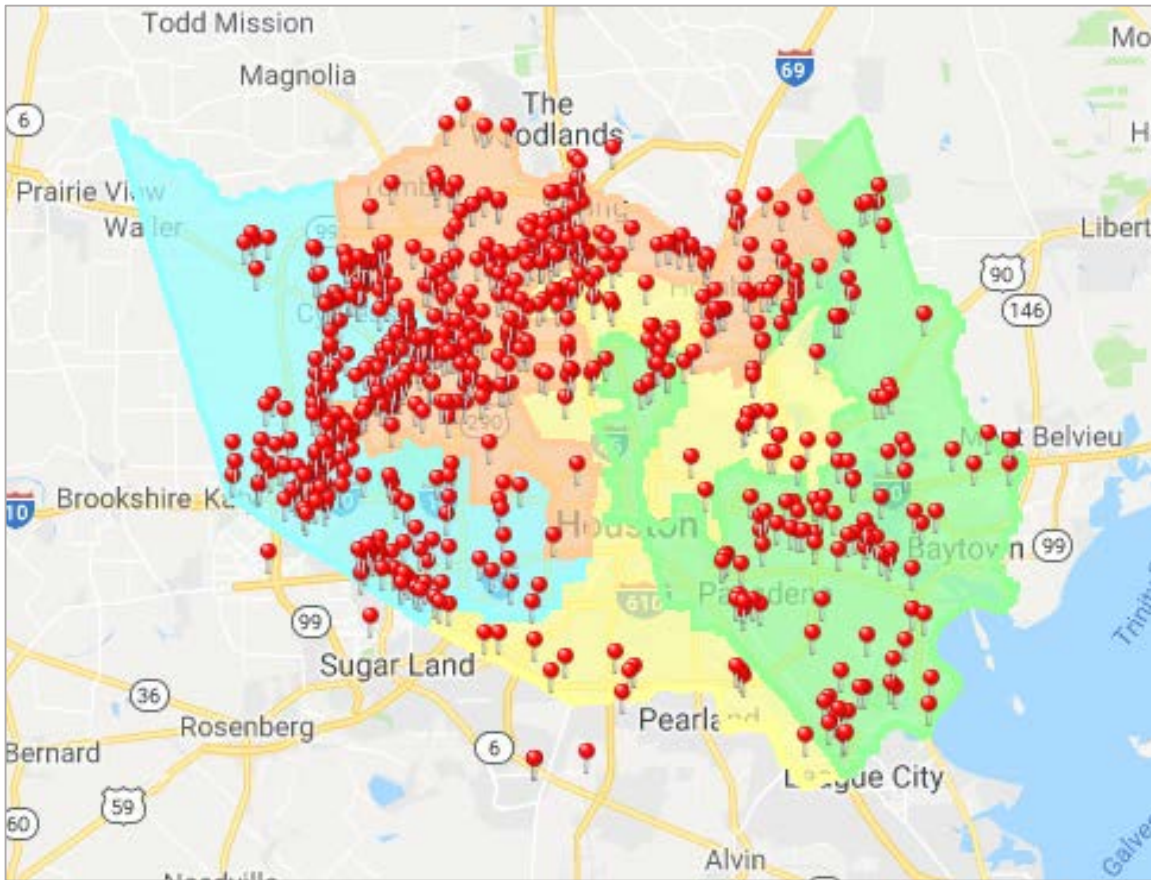


Figure 10. 604 Facilities reporting to have chlorine in their chemical inventories.

To fully understand the potential hazards and risks that a facility presents to the community would require a comprehensive hazard analysis that identifies each product of concern, including the size of the containers, the potential releases possible, and any mitigating systems in place. Dispersion modeling would need to be conducted to determine the behavior of the released chemical and predict and interpret down-wind movement and estimated concentrations. The potential threat zones would need to be mapped to identify the populations at risk and the critical infrastructure that may be impacted in the event there was a release of the product.

Harris County has almost 10,000 miles of pipelines running through many parts of the county, including all four Commissioners' Precincts. These pipelines carry many different products, including but not limited to crude oil, natural gas, ammonia, gasoline, diesel fuel, aviation fuel, and hydrogen. The products are transported in both liquid and gaseous physical states at pressures of 1,000 pounds per square inch or higher. This risk analysis was conducted using the 2015 Homeland Security Infrastructure Protection (HSIP) dataset. The pipeline transmission locations were mapped and displayed in the image below.

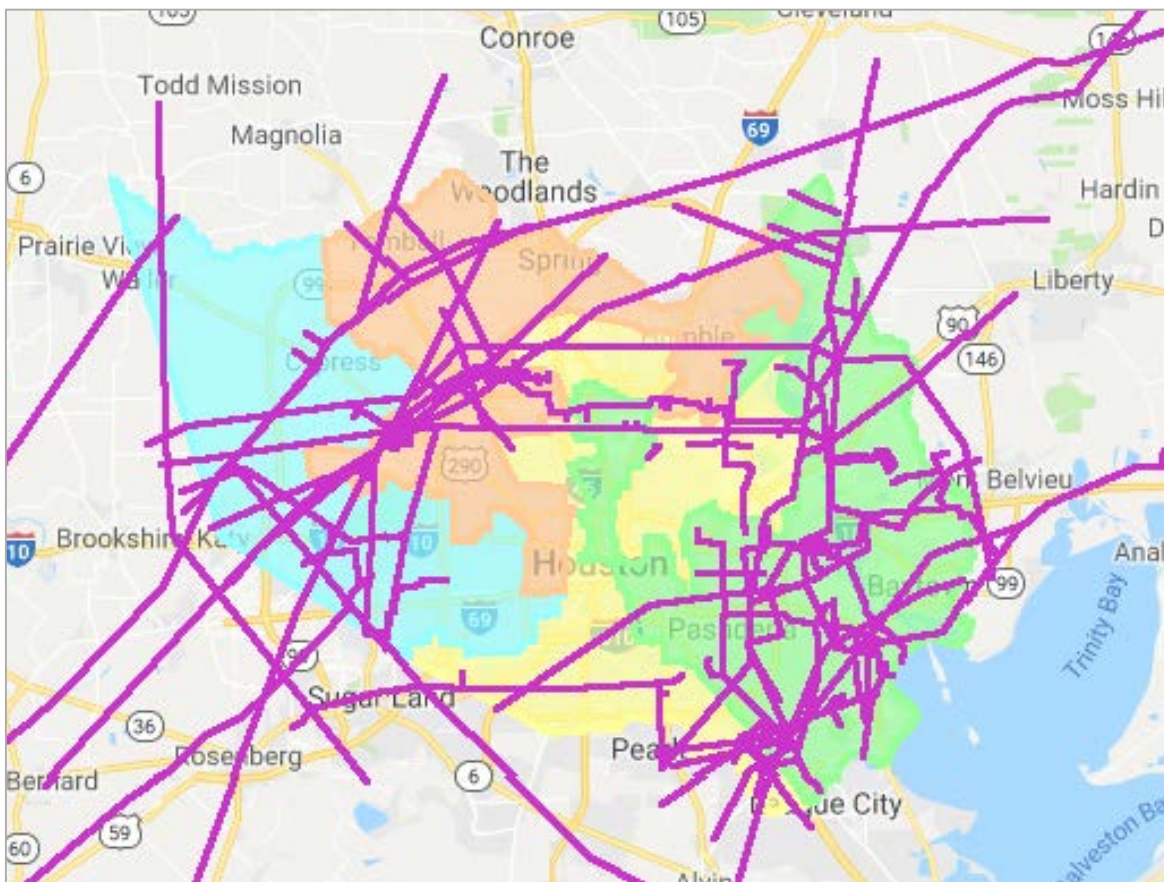


Figure 11. Pipeline transmission locations in Harris County, based on the 2015 Homeland Security Infrastructure Protection (HSIP) data.

There are over 1,700,000 people who live within one half mile of these pipelines. There are also 338 schools and 38 hospitals within this distance. There are 615 Chemical Reporting Facilities within 1/4 mile of these pipelines. These life threatening exposures demonstrates the importance of conducting a complete hazard analysis of Harris County.

The Congressional Research Service authored a report, the “DOT’s Federal Pipeline Safety Program: Background and Key Issues for Congress” updated on 29 March 2019. The report notes:

“The NTSB highlighted aging pipelines as a particular concern in its 2019-2020 Most Wanted List of Transportation Safety Improvements. Likewise, Congress has ongoing interest in the safety of older transmission pipelines and in the replacement of leaky and deteriorating cast iron pipe in natural gas distribution systems. Recent accidents involving older pipelines and related infrastructure may refocus attention on PHMSA’s regulation of pipe replacement (currently voluntary), pipeline modernization projects and work packages, older pipeline records, safety management systems, and other issues related to aging pipelines.”

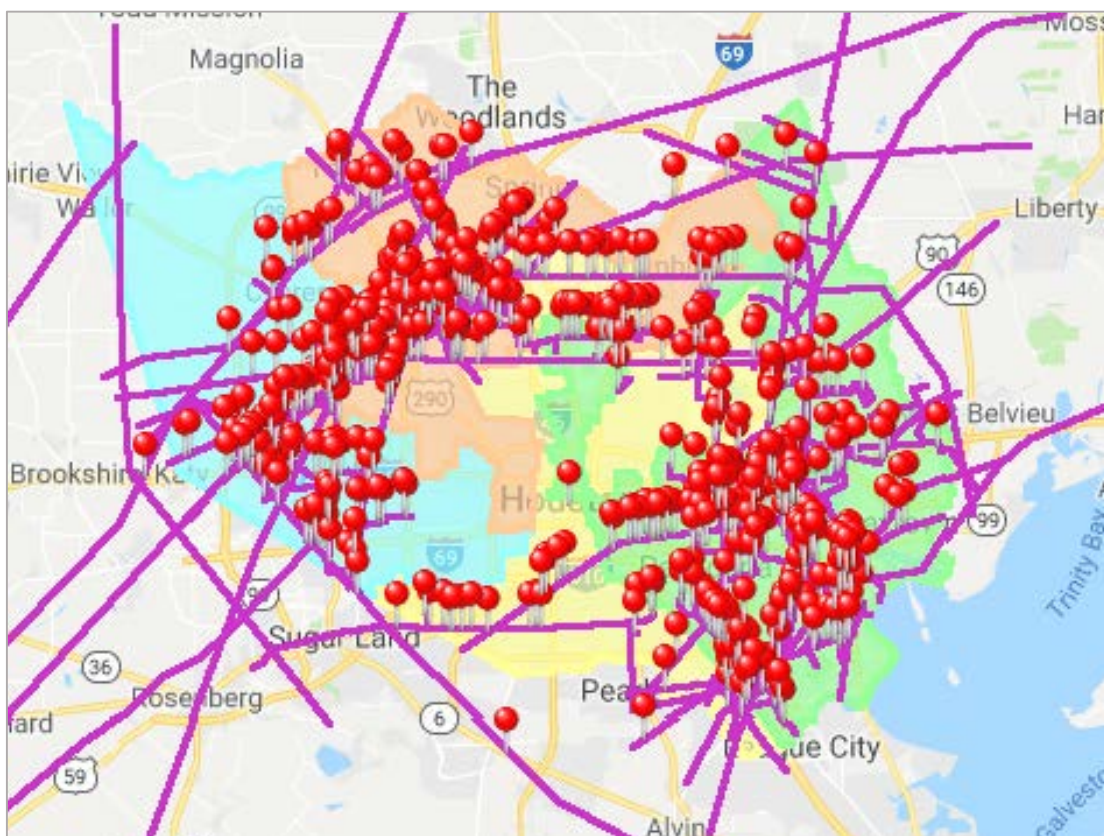


Figure 12. 615 Tier 2 Chemical Reporting Facilities shown within 0.25 miles of a pipeline.

Gaps and Recommendations

Gap 1

A review of the Tier 2 Reporting Data presented in the Atlas mapping system revealed that there were several errors in the data submitted by the chemical reporting facilities. There were several incorrect data entries, including some chemicals incorrectly marked as Extremely Hazardous Substances that were not, as well as some not marked that should have been marked. For example; over 60 records of diesel fuel were marked as EHS chemicals (diesel is not an EHS). A new dataset was acquired from TCEQ and was corrected to accurately represent the EHS chemicals, which provided different results than those shown in Atlas.

Recommendations

To update the Tier 2 reporting data, there are three viable options:

- Option 1: Update the Atlas dataset with the corrected 2017 Tier 2 reporting data completed as part of this project by PENTA. Provide this corrected data to the HCFMO Hazardous Materials Response Team to be utilized for response and planning activities and on-scene modeling support.

- Option 2: Using the newly available 2018 Tier 2 reporting data, direct the Atlas Mapping System Management Team to correct and update the data and import into the Atlas system. Provide this corrected data to the HCFMO Hazardous Materials Response Team to be utilized for response and planning activities and on-scene modeling support.
- Option 3: Hire a skilled contractor to verify/update/correct EHS reporting, CAS numbers, and chemical names and update the data and import into the Atlas system using the newly available 2018 Tier 2 reporting data. Provide this corrected data to the HCFMO Hazardous Materials Response Team to be utilized for response and planning activities and on-scene modeling support. Approximate cost for this option is \$45,000.

Gap 2

Identification of facilities that store or use hazardous chemicals and EHSs only recognizes where a potential hazard exists. The intent of EPCRA is to have the local responders and planners identify the vulnerable areas around the facilities and to develop protective strategies in the event there is a chemical release. This process is identified in the EPCRA standard and can be accomplished using commonly available software. A method to identify the facilities presenting the greatest hazard potential is available (Mary K. O'Connor Process Safety Center) which can be used to identify and prioritize which facilities would present the greatest hazard to the surrounding areas.

Recommendations

Recommend the Harris County Fire Marshal's Office use the Tier 2 data to identify the chemicals on site and initially identify the top 20 facilities that have the largest quantities of the most hazardous chemicals. Conduct site visits of these facilities to gather comprehensive information to complete the hazard analysis including worst case and multiple alternative case scenarios.

There are three options to complete this task:

- Option 1: Utilize LEPC members: While this is a function that the Local Emergency Planning Committee is tasked with as part of the EPCRA requirements, LEPC's are not funded, staffed, and equipped to carry out a task of this nature. Typically, LEPCs do not have members that are familiar with this process.
- Option 2: Assign Harris County Fire Marshal's Office inspectors and HazMat Team members to complete the task. It should be noted that these personnel have other responsibilities that would distract them from their normal assigned duties if they were tasked with this mission. An alternative could be to hire additional inspectors and HazMat Team members, but this may prove to be cost prohibitive.
- Option 3: Hire a contractor to complete this function. Using a two-person team, it is estimated that this process can be completed for a single facility in an average of two days for approximately \$10,000 per facility.

Gap 3

The pipeline hazard analysis was conducted using 2015 Homeland Security Infrastructure Protection (HSIP) program data. Harris County has more recent data from the National Pipeline Mapping System through the Pipeline and Hazardous Materials Safety Administration. Harris County signed a confidentiality agreement not to share this data. As this data was not available to PENTA, 2015 HSIP data was used to identify the location and products transported through these pipelines.

This limited the accuracy of the analysis, as there have been many additional new pipelines constructed that have not been identified in the available dataset.

Recommendations

There are three options to update this information in the future:

- Option 1: Utilize LEPC members: While this is a function that the Local Emergency Planning Committee is tasked with as part of the EPCRA requirements, LEPC's are not funded, staffed, and equipped to carry out a task of this nature. Typically, LEPCs do not have members that are familiar with this process.
- Option 2: Assign Harris County Fire Marshal's Office inspectors and HazMat Team members to complete the task. It should be noted that these personnel have other responsibilities that would distract them from their normal assigned duties if they were tasked with this mission. An alternative could be to hire additional inspectors and HazMat Team members, but this may prove to be cost prohibitive.
- Option 3: Hire a contractor to complete this function. Update the dataset with the most recent pipeline data to generate new analysis and identify potential risk to the public and critical infrastructure in Harris County. Estimated cost for this option is \$30,000.

Departmental Assessments Summary

The following pages provide an overview of the four departments analyzed as part of the Multi-Agency Coordinating Group Gap Analysis. These included the:

- Harris County Office of Homeland Security and Emergency Management
- Harris County Fire Marshal's Office
- Harris County Public Health Department
- Harris County Pollution Control Services Department

The following law enforcement organizations also provided input into this Multi-Agency Coordinating Group Gap Analysis:

- Harris County Sheriff's Office
- Harris County Precinct 1 Constable
- Harris County Precinct 2 Constable

- Harris County Precinct 3 Constable
- Harris County Precinct 4 Constable
- Harris County Precinct 5 Constable
- Harris County Precinct 6 Constable
- Harris County Precinct 7 Constable
- Harris County Precinct 8 Constable

As part of this assessment, project team members reviewed the plans, training and/or competencies, resources, capabilities, and facilities within each department.

Department Gap Analysis summarizes the major findings for that department, many of which are expanded upon elsewhere in the Department Assessment and may have corresponding recommendations in the Final Analysis and Recommendations section.

Plans included any departmental plans, standard operating procedures (SOPs), standard Operating Guides (SOGs), and similar items. This review also considered any annexes within the Harris County Emergency Operations Plan that these departments were designated as the lead agency for.

Training and/or Competencies pertains to that training related to hazardous materials response that members of these departments are required to have. This review also studied what training has periodic currency requirements. Project team members looked at initial training conducted as part of the onboarding process of new hires as well as training conducted as course of normal business and competencies that should be maintained.

Resources are the tools of the trade that department members use in their jobs that are related to hazardous materials response and management.

Capabilities are typically an outgrowth of both training and resources, but with the skill and ability factors added in.

Facilities are brick and mortar structures and space requirements needed to effectively carry out day-to-day hazardous materials response activities.

Harris County Office of Homeland Security and Emergency Management



Harris County Office of Homeland Security and Emergency Management (HCOHSEM)



Figure 13. Activities at the Harris County Office of Homeland Security and Emergency Management.

Mission

The Harris County Office of Homeland Security and Emergency Management (HCOHSEM) will be a national model of best practices in emergency planning, preparation, response and recovery. HCOHSEM will help prepare, safeguard and protect the residents and property of Harris County from the effects of disasters through effective planning, preparation, response and recovery activities. To accomplish this mission, HCOHSEM will:

- Develop, maintain and coordinate a comprehensive emergency management plan.
- Activate and staff an Emergency Operations Center (EOC) to coordinate and support efforts to respond to, and recover from, emergencies and disasters.
- Develop and assist in the delivery of effective public outreach programs.
- Collect, provide and disseminate information for elected officials, the media, our residents, partners and other stakeholders.
- Train, educate and prepare for emergencies through the development and delivery of effective classes, drills and exercises.

Overview

Engagement Activities: Texas Association of Municipal Information Officers
Emergency Management Association of Texas
Texas Emergency Management Advisory Committee
Public Relations Society of America
International Association of Emergency Managers

Big Cities Emergency Management
State Citizen Corps Council
Texas Emergency Management Council
Legal Services Corporation Disaster Taskforce
Regional Joint Information Center Network
Regional Joint Information Center Working Group
Houston Galveston PIO Network

Contact: 6922 Old Katy Road
Houston, TX
(713) 881-3100

Department Gap Analysis

The Harris County Office of Homeland Security and Emergency Management (HCOHSEM) is recognized throughout the nation as one of the premier emergency management organizations. People from around the world visit TranStar annually to see how emergencies are managed in Harris County. This is something that Harris County should be justifiably proud of. As firm believers in continuous quality improvement, the personnel comprising this department are always seeking means to improve the quality of their services. Ensuring that the Emergency Operations Center (EOC) is staffed with trained and capable personnel from inside and outside their department is a critical key to success. Improving the understanding and relationship with the private sector, particularly the oil and gas, chemical, and energy sectors that comprise the largest petrochemical complex in the Western Hemisphere, is also critical. Detailing an effective process on how best to transition from an emergency response phase to a long-term recovery phase is another key to improvement. As the emergency management subject matter experts, HCOHSEM is cognizant of the importance of training, not only for the department, but for other County agencies and elected leadership; encouraging greater participation in training programs, many provided at no cost by the State of Texas, will improve readiness and capabilities. Being the champions for active participation within a Unified Command is crucial to ensure that local authorities having jurisdiction have a voice in the management and direction of incidents that happen within their area of responsibility. Finally, determining a standardized means to best convey a Common Operational Picture (COP) from an Incident Command Post (ICP) to the Emergency Operations Center to elected leadership will ensure situational awareness and better enable emergency managers to more effectively inform the residents of Harris County.

Plans

The Harris County Office of Homeland Security and Emergency Management has overall responsibility for the County's Basic Emergency Operations Plan and Annexes. All plans and annexes have been revised and updated as required. All plans are revised within the five-year planning cycle and have been reviewed annually as required. Planning gaps identified include:

Immediate Recommendations

Confirm identity of county personnel by agency and name with assigned duties in the EOC. Provide all identified personnel with comprehensive details on roles, responsibilities, and expectations. Ensure adequate depth for long-term operations (primary, secondary, tertiary). HCOHSEM should maintain a master list based on submissions from each department assigning personnel to the EOC.

One-Year Recommendations

- Develop an Industrial Appendix to better define roles, responsibilities, and expectations during incidents.
- Develop within the plan how to transition to a longer-term operation, building staffing/resource redundancy.

Two-Year Recommendations

- Ensure all elected officials and department heads are aware of and encouraged to attend *MGT-312: Senior Officials Workshop for All-Hazards Preparedness* offered through the Texas Engineering Extension Service.

Training and Competencies

The HCOHSEM makes very good use of training offered through [PreparingTexas.org](https://www.preparingtexas.org), the Texas Engineering Extension Service, and other available opportunities. Many staff members additionally serve as instructors for myriad of courses. The department is very active in the International Association of Emergency Management and the Emergency Management Association of Texas. The HCOHSEM is also a very active participant in a wide array of all-threat/all-hazard exercises. Training and Competency gaps include:

One-Year Recommendations

- Harris County needs to engage local industry in developing an Industry Terminology Course (Industry-101) to facilitate a better understanding of local industries. This course can be presented to County departments that respond to industrial incidents. Site visits should be included in this course to reinforce knowledge of industry and critical infrastructure.

Resources

The HCOHSEM has a fully trained, qualified, and professional staff along with a state-of-the-art EOC. During emergencies, more than 350 emergency management personnel from a variety of agencies staff the EOC. All county departments can and do provide resources during an emergency within Harris County. The nature of the incident will determine agency and individual participation in EOC activities. The County EOC is designed and equipped to accommodate all hazard incidents and major events. Resource gaps identified include:

Immediate Recommendations

- Engage Harris County agencies—Harris County Fire Marshal’s Office, Sheriff’s Office, Constable Precincts, and others—to better discern potential need or desire for an Operations Section Chief within the Emergency Operations Center.

Capabilities

The HCOHSEM has the overall ability to stand-up an EOC Management Team that includes the capacity to communicate with responders and the public.

Local On-Scene Coordinator/Commander (LOSC)

While it is recognized that the HCOHSEM “coordinates” rather than “commands and controls,” their understanding of doctrinal procedures, along with assistance from appropriate Harris County agencies and regional partners, can be critical in rapidly establishing a functioning Unified Command or Area Command. They possess the requisite knowledge, skills, and abilities to effectively discern what agencies should be part of a Unified Command and what agencies should be in a supporting role.

One critical factor is in the determination of who is the local “authority having jurisdiction.” Should an incident occur in unincorporated Harris County, that area is still served by a political subdivision of the State of Texas and is represented by duly elected officials from the State of Texas. This applies not only to Emergency Services Districts (there are 33 of these in Harris County) but also to Fire/EMS agencies supported or contracted by Water Control Districts or Municipal Utility Districts. As a result of this, Harris County agencies, unless authorized under statute, need a comprehensive understanding of the specific Authority Having Jurisdiction and work towards an equitable solution for all parties.

For incidents that occur within an incorporated jurisdiction of Harris County, the role of the County within a Unified Command may be limited to a supporting or liaison function. Relationships and procedures established by the HCOHSEM ensure open lines of communications exist between municipal EOCs to County EOC.

An example of a functional and effective Unified Area Command established by the HCOHSEM used during the Hurricane Katrina Mega-Shelter Operations in August-September 2005. See Figure 14.

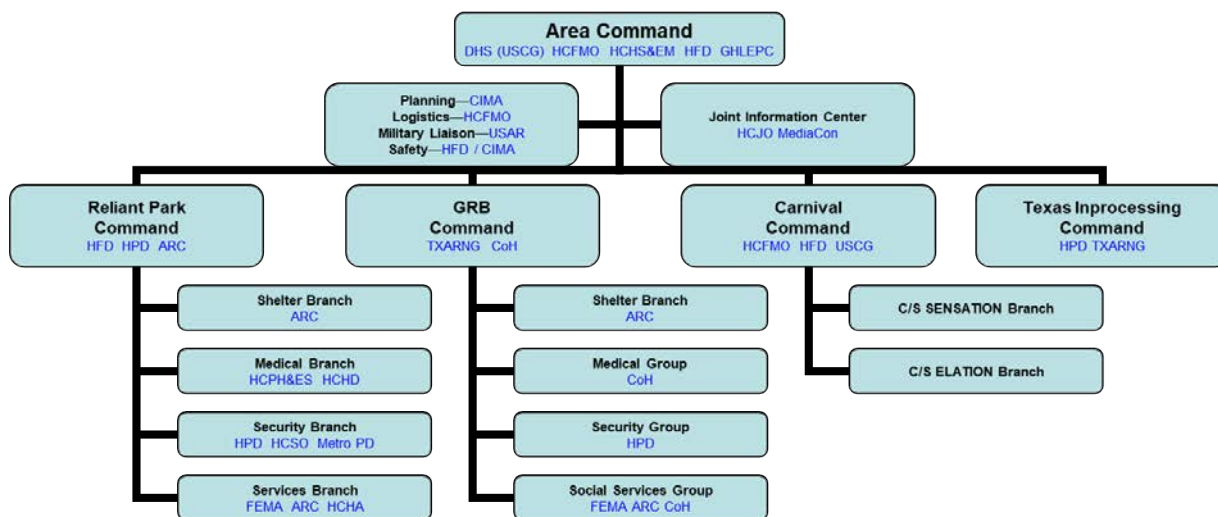


Figure 14. Hurricane Katrina Mega-Shelter Operations in the Houston area, August-September 2005.

A very basic Unified Command structure found at a typical Type-3 Hazardous Materials Incident that occurs in the unincorporated areas of Harris County may look something like:

Unified Command		
Role	Lead	Deputy
Federal On-Scene Coordinator	US Coast Guard	Environmental Protection Agency
State On-Scene Coordinator	Texas Commission on Environmental Quality	
Local On-Scene Coordinator	Harris County Fire Marshal's Office	Harris County Pollution Control Services Department
Responsible Party On-Scene Coordinator	Industry	

The Second 80's Incident in March 2019 showcased the need for Harris County's active participation within the established Unified Command. The lack of an assigned Local On-Scene Coordinator within the Unified Command impacted the flow of information from the Incident Command Post at ITC to senior officials at Harris County. A Unified Command as defined in the Homeland Security Presidential Directive-5 and the National Incident Management System, and further referenced under the Federal Response Framework, the Stafford Act, Oil Pollution Act of 1990, and the Comprehensive Environmental Response, Compensation, and Liability Act is normally comprised of qualified persons from the federal government, state government, local authority having jurisdiction, tribal entities, and, when appropriate, the responsible party.

The Houston-Galveston region pioneered the concept of adding the Local-On Scene Coordinator (LOSC) during the San Jacinto River Incident in October of 1994 (see <https://ioscproceedings.org/doi/pdf/10.7901/2169-3358-1997-1-972> and <https://ioscproceedings.org/doi/pdf/10.7901/2169-3358-1997-1-19>).

The role of Local On-Scene Coordinator was typically filled by the authority having jurisdiction (usually from a fire department or office of emergency management). Until at least 2012, this role was outlined within the US Coast Guard-managed Central Texas Coastal Area Contingency Plan (see http://www.glo.texas.gov/ost/acp/houston/sectorhoustongalveston_acp.pdf).

While Harris County had personnel from the Fire Marshal's Office and the Office of Emergency Management's Industrial Liaison Officer present in the incident command post throughout the response to the Second 80's incident, the decision was made to have County employees serve as Agency Representatives as defined in the National Incident Management System within the Unified Command and the Joint Information Center.

Although present and able to have their concerns heard, Harris County was not an official or active member of the Unified Command. At times, this level of passive involvement created a perception by senior Harris County officials that accurate information was not being provided in a timely and transparent manner. It is important to note that at no time was there a release of inaccurate information during the incident.

Immediate Recommendations

Recommend that the HCOHSEM maintain a list of common contingency operations that may occur within unincorporated Harris County and list a Lead Department to serve as the Local On-Scene Coordinator and other departments that will serve as Supporting Departments. As seen in the chart below, this has already been accomplished.

On-Scene Incident Coordination Matrix					
Jurisdiction: <u>Unincorporated</u>					
Incident	Lead		Response Coordination/Consideration	Public Coordination/Consideration	Support ³
				HCOHSEM (All Incidents)	
Catastrophic Fire	Local Fire Department ^{1 2}		HCFMO	HC-PC / HC Commissioner	ALL
Hazardous Materials Release (Spill & Air)	Local Fire Department ^{1 2}		HCFMO	HC-PC / HC-PH / HC Commissioner	ALL
Oil Spill	Land	TCEQ/TRRC/TGLO	HCFMO	HC-PC / HC-PH / HC Commissioner	ALL
	Water	HPOA/USCG/TGLO			
Law Enforcement/Security	Law Enforcement of AHJ ¹		Harris County Law Enforcement	ALL	ALL
Pandemic	Public Health				ALL
Severe Weather	Local Fire Department ^{1 2}		HCFMO	HC-PC / HC-PH / HC Commissioner	ALL
Terrorism	Local Fire Department/LE for AHJ ^{1 2}		HCFMO/HC Law Enforcement	ALL	ALL
Mass Casualty	Local Fire Department/EMS/SETRAC ¹		HCFMO	ALL	ALL
Biological	Public Health				ALL
¹ Shall include applicable political subdivision either directly or contractually providing/authorizing services to be delivered					
² If responsible party (RP) identified, then the RP shall be in Unified Command as well.					
³ Legal assistance: Civil = County Attorney's Offices / Criminal = District Attorney's Office					
Acroynm					
HC-PC = Harris County Pollution Control					
HC-PH = Harris County Public Health					
HCOHSEM = Harris County Office of Homeland Security an					
HCFMO = Harris County Fire Marshal's Office					
SETRAC = Southeast Texas Regional Advisory Council					
AHJ = Authority Having Jurisdiction					
TCEQ = Texas Commission on Environmental Quality					
TRRC = Texas Railroad Commission					
TGLO = Texas General Land Office					
HPOA = Houston Port Authority					
USCG = United States Coast Guard					

In addition to providing a representative to serve within the Unified Command, the Lead Agency will also provide an Operations Section Manager/Chief (depending on terminology desired) to the Harris County EOC. This Operations Section Manager/Chief will serve to facilitate operational support and provide subject matter expertise to emergency managers and elected leaders operating out of the Harris County EOC.

Harris County personnel designated to serve as Incident Commanders or as members of a Unified Command or Operations Section Manager/Chief should receive additional incident management training commensurate with their roles and responsibilities (such as the E/L-950: All-Hazards Incident Commander Course or the E/L-958 All-Hazards

Operations Section Chief Course, both of which are available at no cost through PreparingTexas.org).

Further, it is recommended that the County Attorney's Office draft guidance that follows applicable laws and standards to define the authority, roles, and permissions for a County representative operating within a Unified Command.

Common Operational Picture

As noted in past incidents, there needs to be a greater ability to assess incoming environmental and health data, such as air monitoring and water sampling data, and develop it into actionable information that can be effectively utilized by elected leaders, emergency managers, emergency response leaders, and the Joint Information Center. This information can be incorporated into and shared via a common operational picture managed by the Emergency Operations Center. Capability gaps include:

Immediate Recommendations

- Consider assigning a second person to serve as an Industrial Liaison Officer and provide relief during long-duration incidents and events.

One-Year Recommendations

- Assess current technology and service providers to determine what system or systems would provide the best common operational picture usable by responders in the field, emergency managers at Emergency Operations Center and Joint Information Center, and by elected leaders.

Public Alert and Warning Capabilities

Each Harris County department currently has its own website. At best, the websites have links to other offices' sites, but most are completely independent. The individual sites do not share or jointly use information. Each has a different layout, navigation and community reporting process. One critical challenge in conducting an online information search is that the public will follow the path of least resistance. Harris County's confusing collection of multiple and unconnected websites is not easy to navigate or use. This unfortunately increases user frustration and increases the likelihood that users will simply go elsewhere for information. The result is that the information that is easier to access is often of poorer quality and accuracy. Over time, this leads to frustration from the public and diminished trust and support of county agencies.

As part of this analysis and at the request of the County Judge's Office, outdoor sirens were also reviewed in this study. A detailed review of such systems can be found in the US Department of Homeland Security's "Outdoor Warning Sirens Market Survey Report." This report was developed as part of the System Assessment and Validation for Emergency Responder (SAVER) Program. While the report provides extensive details on specific systems available from a variety of vendors, it fails to detail any evidence of effectiveness with the general public. During the Community Stakeholder Action Workshop, it was noted that the residents of Harris County struggle to distinguish between

a wide array of sirens, some at the local government level and some from the industrial plants. With such a variety of signals emanating from a multiple sources, it is difficult for citizens to discern what these sounds are conveying and therefore to know what to do in response.

To effectively enhance general stakeholder communication and public alert and warning capabilities more specifically, Harris County should:

- Standardize Harris County website layouts.
- Create a Harris County Public Information Page or adjust the ReadyHarris website.
- Establish the ReadyHarris website as the single electronic Harris County Public Notification System.
- Make information available in the following languages:
 - English
 - Spanish
 - Mandarin Chinese
 - Vietnamese
 - Access for the Hearing / Visually Impaired (ASL)

Note: Urdu may be added soon. Harris County will need to discern the need to add Urdu following the release of the results of the 2020 census

- Create a Social Media Coordinator position within each department. During activations of the Harris County EOC, these individuals must report to the Joint Information Center to coordinate messaging efforts.
- Ensure that departmental Public Information Officers and Social Media Coordinators have access to utilize and update the ReadyHarris website; this recommendation is for normal/regular workdays. This will help increase public use and trust of the public. During an incident, information should go through the normal approval Joint Information Center process.
- Ensure that each department has Social Media Coordinator (SMC) who works for the PIO and has at least the following training:
 - IS-700.b - An Introduction to the Incident Command System
 - IS-100.c - Introduction to the Incident Command System, ICS-100
 - IS-800.c - National Response Framework, An Introduction
 - NRT JIC Model
- Create a query data bank.
- Increase active participation in the Houston-Galveston Public Information Group.
- Conduct regular Public Information Officer and Social Media Coordinator Training.
- Continue to use the National Response Team's Joint Information Center model as the structure to support active and sustained information activities before, during, and after incidents and emergencies.
- Enhancing public siren systems may seem like a logical investment, but this is inadvisable without an accompanying large scale public education and awareness

campaign. The cost of such a campaign would likely make this approach cost-prohibitive for the County. Further, since many people already receive alerts and notifications via their mobile phones, and because mobile alerts are the fastest way to get information directly to residents, it is recommended that the County rely on the soon-to-be-improved Wireless Emergency Alerts (WEA) notification system (outlined below), rather than invest in any type of enhanced public siren system.



MOVING WEA FORWARD

A Wireless Emergency Alerts (WEA) Primer and Policy Update
MARCH 2018

WHAT IS COMING

- **WEA Testing:** Alert Originators will be able to send out “live” WEA test messages (5/1/19).
 - **WHY:** Like tests of the Emergency Alert System, alert originators will be able to send messages that are received by devices. This may increase emergency management/public safety’s confidence in using the system and make the public more familiar with messages. It is highly recommended that alert originators use this capability sparingly.
- **Alert Message Preservation:** Cell phones will be required to preserve WEA messages for at least 24 hours (11/30/19).
 - **WHY:** In certain situations, an alert message recipient may want to refer back to information provided in the WEA message after initially reviewing it.
- **Consumer Choice:** Carriers will be required to disclose at the point of sale if a device or network does not fully support WEA.
 - **WHY:** Empowers consumers to decide if they want to purchase a device or service on a network that won’t provide them information during an emergency.

WHAT STILL NEEDS TO BE DONE

- **“Many-to-One” Feedback:** upgrading the WEA system to support capturing feedback from WEA recipients via simple polling questions.
 - **WHY:** Will allow alert originators to quickly aggregate information and utilize that information to deploy scarce resources more efficiently.
- **Multimedia-Based Alerts:** allow images and/or graphics to be included in a WEA message
 - **WHY:** Will allow for better communication/ understanding of WEA messages by recipients, including those with limited English proficiency.
- **Real World Example:**
In the 2016 Chelsea Bombings in New York City,

NYCEM was unable to include a photograph of the wanted terrorist, instead needing to direct WEA recipients to “see media for pic.” Only 45% of WEA recipients took that extra step.



- **Multilingual WEA Messages:** Languages other than Spanish.
- **Earthquake Messaging:** Require carriers to transmit earthquake messages within three seconds of receiving a message from a federal sensor.
- **System Reporting:** carriers provide data that allows alert originators to understand where, if any, gaps in WEA coverage exist in their jurisdiction.
- **User Choices:** cell phone users can set restrictions on when and what type of messages they would receive.

WHAT’S NEXT

- Forthcoming Public Notice from the FCC
- Bills introduced in Congress

WHAT YOU CAN DO

- Send comment letters to the FCC urging them to take action
- Participate in WEA-related webinars and discussions
- Help draft and get op-ed stories published
- Learn more about WEA and educate others in your organization

Join the National Public Safety Organizations in support of WEA Enhancements:









FOR MORE INFORMATION, CONTACT:

Ben Krakauer
bkrakauer@oem.nyc.gov
718-422-8711

Hallie Frazee
hallie.frazee@oem.hctx.net
713-426-9578





MOVING WEA FORWARD

A Wireless Emergency Alerts (WEA) Primer and Policy Update
MARCH 2018

WHAT IS WEA?

Wireless Emergency Alerts (WEA) is an emergency communication system that allows customers who own certain wireless phones and other enabled mobile devices to receive geographically-targeted, text-like messages alerting them of imminent threats to safety in their area.

Wireless companies volunteer to participate in WEA, which is part of public/private partnership between the FCC, FEMA and the wireless industry to enhance public safety. Most major wireless companies participate in WEA.

Alerts from WEA cover only critical emergency situations. Consumers may receive only three types of alerts:

1. Alerts issued by the President
2. Alerts involving imminent threats to safety or life
3. AMBER Alerts



TERMS TO KNOW

- **Alert Originator:** Public safety or emergency management official that is authorized by the FCC to send a WEA message for their jurisdiction
- **Alert Origination Software Provider:** Software used by an approved alert originator to send a WEA message via the IPAWS system.
- **Carriers:** Cell phone service providers
- **Geo-targeting:** Ability to select a specific area that a WEA message will be sent to
- **IPAWS:** Integrated Public Alert and Warning System. System maintained by FEMA for the purposes of collecting and disseminating alerts from a wide variety of inputs to a wide variety of outputs, including WEA.

WHERE WE ARE

Currently, a WEA message:

- Can contain 90 characters
- Be geo-targeted to reach a target area based on wireless network towers covering a particular area
- Can contain URLs and telephone numbers
- Carriers are required to:
- Produce regular reports on errors that occur when delivering a WEA message

To increase awareness, government agencies will:

- Develop PSAs that use the WEA/EAS signals to help the public understand these systems

WHAT IS COMING

- **Improved Geo-Targeting:** Using device-based technologies WEA messages will be able to be sent to a specific area and limited to 1/10 of a mile of overshoot (11/30/19)
 - **WHY:** To reduce warning fatigue but ensuring only the people who need the information receive it.
 - **Real World Examples:** During Hurricane Harvey county officials could only send a countywide WEA message (4.7 million people/1700+ square miles) which limited the ability to reach specific areas that were facing different types of emergencies. During the California wildfires, messages could not be targeted to the rapidly changing areas that were in danger from the blaze. When a second IED was found in Manhattan following the initial bombing a WEA that was targeted to several square blocks was received miles and miles away.
- **Increased Character Count:** Alert originators will be able to send up to 360 characters of text (5/1/19)
 - **WHY:** Social science research informs us that 90 characters is not sufficient to tell people what's going on, what they should do, why it's important, and who is providing them the information.
- **Spanish Language Capability:** Alert originators will be able to send information in Spanish as well as English (5/1/19).
 - **WHY:** To ensure the Spanish-speaking community is able to understand and take action on emergency messages.

FOR MORE INFORMATION, CONTACT:

Ben Krakauer
bkrakauer@oem.nyc.gov
718-422-8711

Hallie Frazee
hallie.frazee@oem.hctx.net
713-426-9578

Figure 15. An alert and warning infrastructure.

Facilities

The Harris County Emergency Operations Center is one of the most capable facilities in the nation. The EOC is centrally located with good vehicle access and the EOC is adequate to support most emergencies within the county. Contracts are in place to provide meals for personnel responding to this location. Identified Facility gaps include:



One-Year Recommendations

- Expand available space for the Joint Information Center to better meet the needs of all stakeholders. The current facility designated as the Joint Information Center is between 300-400 square feet and is not capable of supporting a fully staffed Joint Information Center. Recommend finding appropriate space within TranStar to support this critical mission.
- Stress relief is important on long-duration incidents. Consideration should be given to dedicating space for a workout facility that staff can use to maintain personal health and readiness when the EOC is activated. Cost of equipment will be based on the size of the room available.

Two-Year Recommendations

- Recommend engaging municipalities within Harris County as well as industry to discern if it is possible to begin standardizing outdoor warning sirens and educating residents of Harris County about what different sirens indicate. Recognizing that this may be a challenge to achieve across the whole of government and industry within Harris County, strive to maximize participation in a standardized system of audible notification.

Harris County Fire Marshal's Office





WHO WE ARE

The Harris County Fire Marshal's Office (HCFMO) is a specialized law enforcement agency that provides essential public safety services, primarily in the unincorporated areas of Harris County. HCFMO relies on a "customer first" operational philosophy to achieve agency goals and balance community risks regarding fire/life safety and emergency response within the 1777 square miles of Harris County; while encouraging a strong and sustainable economy.



INVESTIGATION

Texas Local Government Code, Chapter 352, Subchapter B authorizes the County Fire Marshal to investigate the cause, origin and circumstances of any fires in the unincorporated areas of the county, including the right to enter and examine a structure where a fire has occurred.

If the County Fire Marshal determines that further investigation of a fire or of an attempt to set a fire is necessary, the Marshal may subpoena witnesses and documents, administer oaths; take and preserve written statements, affidavits, and depositions; and file criminal charges for arson, attempted arson, conspiracy to defraud, failure to cooperate or any other crime against a person the Marshal believe to be guilty.

Texas Local Government Code, Chapter 352.016 authorizes the County Fire Marshal to inspect for fire or life safety hazards any structure, appurtenance, fixture, or real property located within 500 feet of a structure, appurtenance, or fixture. Further, the Marshal shall inspect a structure for fire or life safety hazards if call on to do so, or in response to a complaint. Harris County is currently under the 2012 Fire Code. The 2018 Fire Code has been adopted and goes in to effect September 2019. The County Fire Marshal may order the owner or occupant of the premises to correct the hazardous situation. If ordered to do so, an owner or occupant shall correct the hazardous situation in accordance with the order.

PREVENTION



EMERGENCY OPS

Emergency Operations is responsible for the effective planning, mitigation and recovery from emergencies and disasters—whether natural, accidental or deliberate. This program supports local fire departments and law enforcement with hazardous spills and chemical releases.

Local Government Code, Section 352.019, authorizes the county fire marshal to coordinate specific firefighting activities in the county. On request, the county fire marshal may assist an emergency services district (ESD) to accomplish its powers and duties, act as the incident commander in a major event, and/or suggest voluntary guidelines for certain fire departments about fire incident reporting, emergency incident management, firefighter certification, and automatic mutual aid. Fire departments and Emergency Services Districts are NOT obligated to adopt such guidelines.

Operational Support provides comprehensive and effective training in the fields of Hazardous Material Response, Investigation, Inspection, and other first responder training based on national standards and emergency response demands.

Harris County Commissioners Court has authorized the fire marshal to provide training programs relating to fire service, law enforcement, NIMS and operate a training facility for first responders in the county. The county has established and collected reasonable fees for the training programs, use of the facility, and services provided by the facility. "First responder" has the meaning assigned by Section 421.095, Government Code.

OPERATION SUPPORT



SUPPORT SERVICES

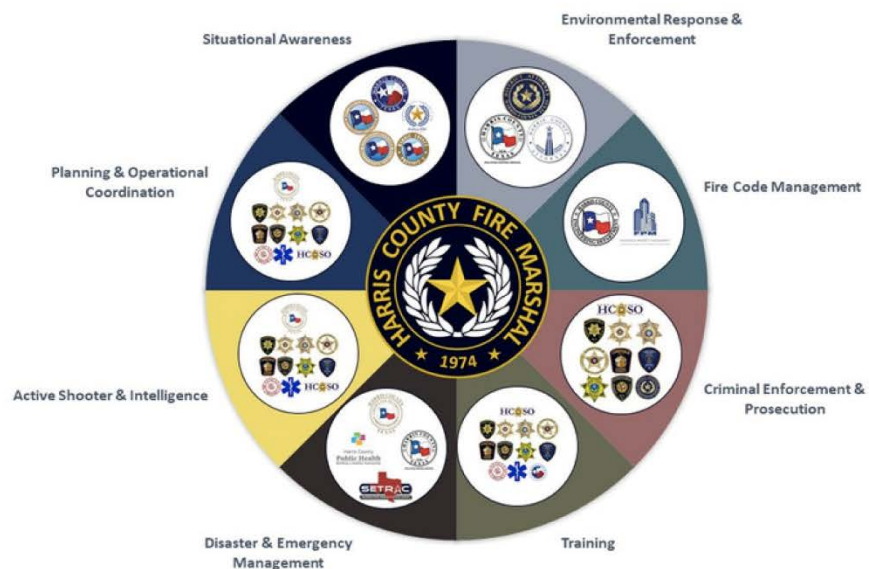
The Service Support Division is responsible for effective accounting, budgeting, employee personnel assistance, and payroll procedures. This division supplies required documentation for purchases authorized by Commissioner's Court and assists all divisions with preparation of the annual budget. This division also provides support to the Agency, including both statistical and logistical support, while maintaining and updating the Agency's internal and external website.

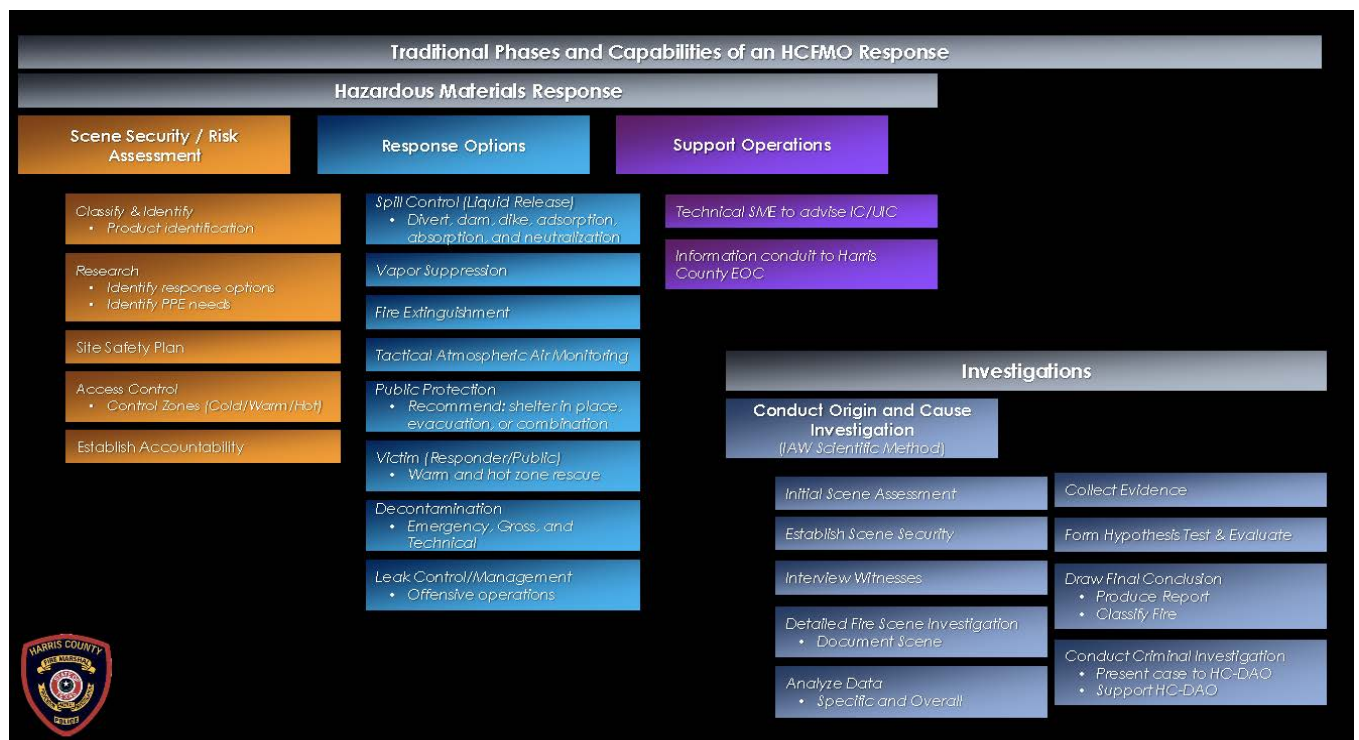
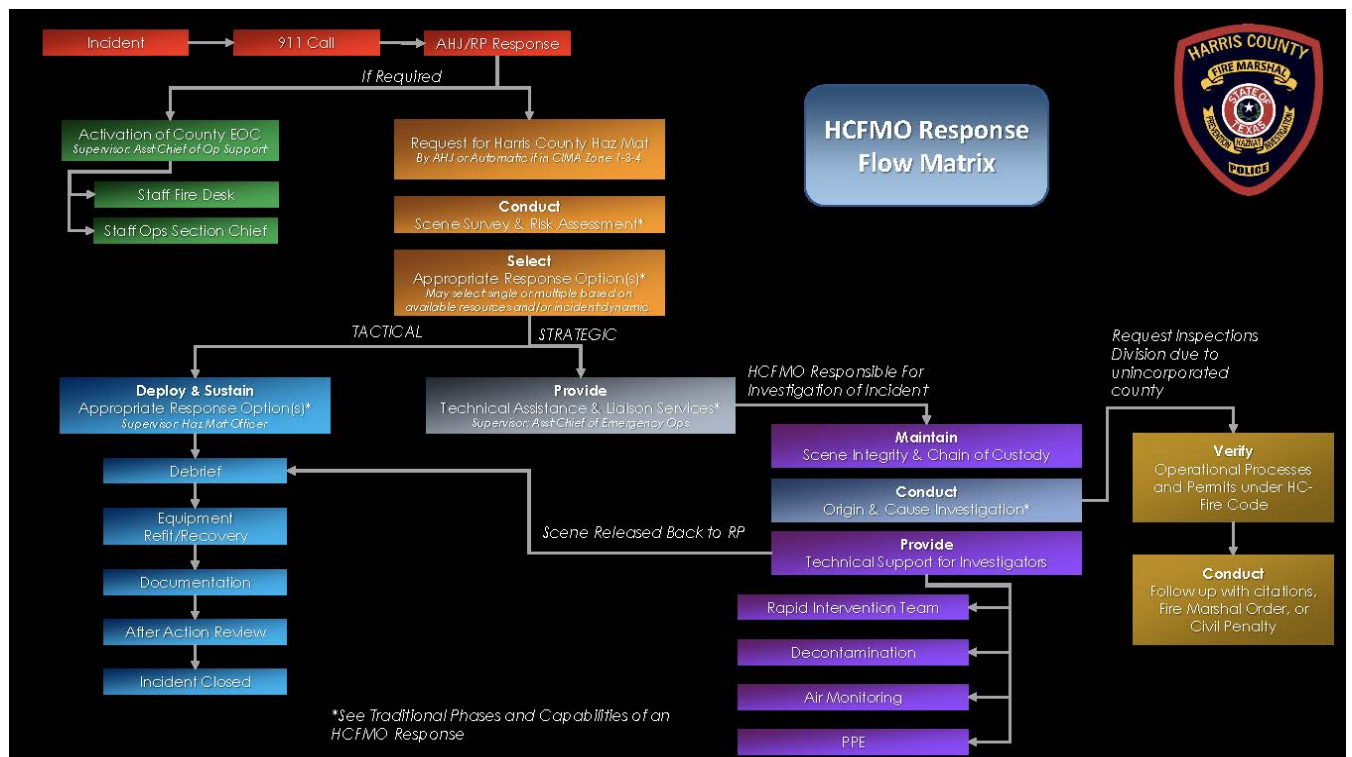
The Harris County Fire Marshal's Office Operational Support Division houses the Outreach Section that consists of three critical components: fire and life safety education, public relations and communication, and youth fire setter intervention. The outreach section coordinates with local partners to provide fire and life safety education messages, which align with national and locally developed strategies.

OUTREACH



HCFMO CONNECTIVITY MATRIX







Harris County Fire Marshal's Office (HCFMO)

Mission

The mission of the Harris County Fire Marshal's Office is to safeguard the lives and property of the residents in Harris County through effective fire prevention, fire investigation, education, emergency response, and emergency management.

Overview

The department comprises five divisions:

- Emergency Operations Division - Comprised of HazMat, Disaster Response, Homeland Security, and Emergency Management Support.
- Fire Investigation Division - Also known as Arson, is staffed by Fire/Arson Investigators.
- Fire Prevention Division - Sometimes called Inspections, is staffed by Fire Inspectors.
- Service Support Division – Staffed by personnel assigned to handle accounting, purchasing, payroll, budgetary and human resource needs.
- Operational Support Division - Is staffed by personnel assigned to handle the logistics, planning, operational liaison, intelligence, and training services.
- Training Division - Responsible for providing comprehensive and effective training in Hazardous Materials Response, Investigation, Inspection, and other fire centric training. Currently reports to the Operational Support Division.

Engagement Activities: International Association of Fire Chiefs
International Association of Chiefs of Police
National Fire Protection Association
Texas Fire Marshal's Association
Emergency Management Association of Texas
Central Texas Coastal Area Committee
Greater Harris County Local Emergency Planning Committees
Channel Industries Mutual Aid
Harris County Firefighters' Association
9 Firematic Outreach Programs

Contact: 7701 Wilshire Place
Houston, TX 77040
713-274-1700

Department Gap Analysis

Along with other Harris County law enforcement agencies, the Harris County Fire Marshal's Office (HCFMO) are some of the most visible responders in the eyes of the residents. The HCFMO Hazardous Materials Response Team has a nationwide reputation and is often consulted by peers across the country to share their knowledge and skills. They recognize that plans need constant updating, more so than just annual updating. They need to incorporate best practices and lessons learned from After-Action Reviews. Because of their skills with the National Incident Management System and active interagency relationships, they should partner with the Harris County Office of Homeland Security and Emergency Management in championing the need for more active participation within a Unified Command to ensure that local authorities having jurisdiction have a voice in the management and direction of incidents that happen within their area of responsibility. Ensuring personnel are trained, resourced with equipment, and capable of addressing current and emerging threats is paramount to ensure the safety and security of the residents of Harris County, and addressing internal needs is a critical first step. Helping other agencies improve their capabilities is a critical follow-on step. Both will require the commitment of resources to be successful. Obtaining the resources (personnel and apparatus) as well as a support facility in western Harris County will go a long way to effectively addressing the safety and security needs of residents in those portions of the County.

Plans

PENTA analyzed plans impacting the Harris County Fire Marshal's Office and noted the following:

- **Communications Plan:** An integrated evergreen document that is updated by response partners with information on agencies regularly engaged in emergency response activities.
- **Harris County Emergency Operations Plan:** Approved by the Harris County Judge and the incorporated mayors of the cities within Harris County. The Harris County Fire Marshal's Office assists the Harris County Office of Homeland Security and Emergency Management with updating certain sections of the Harris County Emergency Operations Plan. Specifically, the following annexes are reviewed and updated by HCFMO along with other County stakeholders as necessary:
 - Annex D - Radiological Protection
 - Annex F - Firefighting
 - Annex Q – Hazardous Materials Response – Note: Describes how the county responds to hazardous materials and oil spill emergencies. Local fire departments have the lead role in responding.
 - Annex R – Rescue
 - Annex V – Terrorism

- **Harris County Fire Marshal's Office Continuity of Operations Plan (COOP):** Describes three levels of COOP for maintaining the continuity of County government activities during a disaster or crisis.
- **HCFMO Fire Desk Guide:** This guide (SO 800.14) describes how the Emergency Operations Center is organized. Describes roles and responsibilities, activation procedures, and WebEOC process.
- **HCFMO Pre-Event Incident Action Plans:** These documents include eight pre-built Incident Action Plans (IAP) for various contingencies.
- **HCFMO Central Texas Coastal Area Contingency Plan:** Federal-State-Local-Industry plan managed by US Coast Guard and published via the Texas General Land Office Tool Kit. Addresses coastal zone oil spills, hazardous materials events, and shipboard fires. This plan formerly addressed Local On-Scene Coordinator/Commander roles and responsibilities.

Local On-Scene Coordinator/Commander

The Second 80's Incident in March 2019 showcased the need for Harris County's active participation within the established Unified Command. The lack of an assigned Local On-Scene Coordinator within the Unified Command impacted the flow of information from the Incident Command Post at ITC to senior officials at Harris County. A Unified Command is discussed in detail in Homeland Security Presidential Directive-5 and the National Incident Management System and referenced under the Federal Response Framework, the Stafford Act, Oil Pollution Act of 1990, and the Comprehensive Environmental Response, Compensation, and Liability Act. A Unified Command for a Type-3 Hazardous Materials Incident is normally comprised of qualified persons from the federal government, state government, local authority having jurisdiction, and the responsible party.

As the most visible practitioners of the National Incident Management System within Harris County, the Fire Marshal's Office should partner with the Harris County Office of Homeland Security and Emergency Management in championing the need for more active participation within a Unified Command. This will ensure that local authorities having jurisdiction have a voice in the management and direction of incidents that happen within their area of responsibility. The Fire Marshal's Office can use their active participation with both the Central Texas Coastal Area Committee and the Houston-Galveston Area Maritime Security Committee to have the role of the Local On-Scene Coordinator once again documented in plans associated with these committees.

PENTA noted the planning efforts listed above are compatible with or exceed those of other counties and cities reviewed. The Harris County Fire Marshal's Office has a very comprehensive set of standard plans, policies, and procedures that are updated and revised as needed or every five years (at a minimum).

Training and Competencies

PENTA analyzed the training and competencies of the Harris County Fire Marshal's Office and noted the following:

- **Hazardous Materials Training:** Hazardous Materials Training is conducted in accordance with OSHA's Hazardous Waste Operations and Emergency Response regulations (29 CFR 1910.120) and the following National Fire Protection Association Standards
 - *NFPA 472: Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*
 - *NFPA 475: Recommended Practice for Organizing, Managing, and Sustaining a Hazardous Materials/Weapons of Mass Destruction Response Program*
 - *NFPA 1072: Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications*

The Harris County Fire Marshal's Office Training Division and Hazardous Materials Response Team provides all levels of hazardous materials training described in the above named NFPA standards to a myriad of agencies within the county. Gaps noted where improvement may be realized include:

Immediate Recommendations

- Currently, there are three qualified operators for the HazMat Response Boat (HazMat Marine-1). This is not a sufficient amount of qualified boat operators to provide long-term operational support during large scale incidents or in support of ESF-10 operations. There is an immediate need to train and have at least six certified response boat operators with the HCFMO to ensure safe boat operations. This can be accomplished with minimal cost (boat fuel, personnel hours).

One-Year Recommendations

- Currently, Harris County conducts one 100-hour open-enrollment Hazardous Materials Technician Course at a cost of approximately \$20,000 per course. Recommend conducting 1-2 additional courses per year, at a cost of \$20,000-\$40,000 per year.
- The wide array of transportation networks and hazardous materials storage facilities throughout Harris County and potential threats warrant additional advanced training for members of the Harris County Fire Marshal's Office Hazardous Materials Response Team. Examples found in *NFPA 472: Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents* include cargo tank truck specialist, intermodal container specialist, marine tank vessel specialist, and WMD response.
- Harris County needs to develop an expanded distance-learning program and training software for multi-jurisdictional agency training and learning capabilities. This would allow first responders within the county to take training on-line and at their own pace.

Recommend that the HCFMO Training Division explore options and develop a long-range plan to expand distance learning capabilities while providing TCFP and TCOLE continuing education.

Resources

PENTA analyzed the resources of the Harris County Fire Marshal's Office and noted the following:

HCFMO Hazardous Materials Response Team Staffing

The Harris County Fire Marshal Office's Hazardous Materials Response Team is one of the busiest in the nation and is the primary hazardous materials response resource for all of Harris County but outside the City of Houston. In addition, the team serves as a mutual aid resource for all counties in the HGAC region. The Team is typically staffed with a company officer and three HazMat Technicians. They are supported by a member of the Fire Marshal's Office Training Branch who serves as HazMat safety officer.

Unlike many other Fire Department Hazardous Materials Response Teams, as members of the Fire Marshal's Office they are part of a law enforcement organization, led by a Fire Marshal with the authority to issue subpoenas. They are often charged with safeguarding evidence, maintaining a chain of custody of evidence, and ensuring security during events.

During the Second 80's Incident at ITC, a member of the Harris County Fire Marshal's Office was asked by the County Judge why the HCFMO Hazardous Materials Response Team was not doing community air monitoring. He explained that the entire four-person team was actively engaged in fire suppression operations, and therefore did not have personnel to do both. Eventually, additional resources were brought in to supplement the HCFMO Hazardous Materials Response Team from the Houston Fire Department's Hazardous Materials Response Team, the 6th Civil Support Team, and hazardous materials technicians obtained through the Texas Interagency Fire Mutual Aid System (TIFMAS).

According to another member of the Harris County Fire Marshal's Office with extensive leadership roles on both the HCFMO and City of Houston Hazardous Materials Response Teams as well as on the NFPA 472 Technical Committee charged with updating national and international standards:

"In the aftermath of the events in the fall of 2001, Harris County, the City of Houston, and the Houston-Galveston Area Council (HGAC) discovered that this 13-county region did not have adequate hazardous materials response assets.

"HGAC developed a Target Capabilities Funding Plan to add additional Type-1 and Type-2 teams to the Region. This plan included: Harris County – Type-1, expand the Houston Fire Department's capabilities to Type-1, and create Type-1 teams in the Woodlands, Fort Bend County, Baytown, and Texas City because of the potential risk of a major hazardous materials incident in this area. Houston and

Harris County were the only dedicated teams. The others would be combination Structural Fire Engines/HazMat Companies.

“The HCFMO Hazardous Materials Response Team was then established by Commissioners Court in the Spring of 2002 with two personnel. Staffing was expanded to a total of six (2 shifts of 3) in 2004, to twelve in 2006 (3 shifts of 4), and to sixteen (4 shifts of 4) in 2015.

“FEMA has recognized the need for minimum staffing of a HazMat Response Team for several years, and the latest FEMA Resource Typing calls for a minimum 8 of personnel per team. This is further supported by the Risk Assessment Chapter of NFPA 475, Recommended Practice for Organizing, Managing, and Sustaining a Hazardous Materials/Weapons of Mass Destruction Response Program.”

DHS/FEMA commissioned a national working group consisting of Federal, State, and Local subject matter experts two years ago to study minimum staffing of hazardous materials response teams. A member of the Harris County Fire Marshal’s Office participated in this working group. After hundreds of hours of work, the HMRT definitions were released for public comment. Following the public comment period, the comments were adjudicated, and the finished product was released on 11 June 2019.






The nationally recognized staffing for Types-1-3 Hazardous Materials Response Teams is now eight persons on duty. The difference between each type refers to specific equipment capabilities (see <https://rtlt.preptoolkit.fema.gov/Public/Resource/View/4-508-1248>).

To properly handle hazardous material incidents in accordance with nationally recognized regulations and standards (such as NFPA 472, NFPA 475, NFPA 1072 and FEMA Resource Typing), the Hazardous Materials Group is directly responsible for ALL tactical HazMat operations that occur in the hot and warm zones. Primary and secondary functions and tasks assigned to the Hazardous Materials Group include:

- HazMat Group Supervisor
- HazMat Safety Officer
- Entry Leader
- Entry/Back-Up Teams (minimum of 4 technicians as required by OSHA stated in 29 CFR 1910.134(g)(4)(i)(ii) and 29 CFR 1910.120(q)(3)(v)(vi)
- Decontamination Leader
- Decontamination Team
- Site Access Control Leader
- Information/Research
- Medical Function
- Resource/Logistics Function

The HCFMO Hazardous Materials Response Team meets the equipment definition of a Type-1 HazMat Team but lacks the required personnel to be recognized as such. By

comparison, the following figure shows the relative staffing levels of HazMat response teams in comparable jurisdictions:

Department	On-duty Shift Personnel	Count	Equipment
<p>Harris County</p> 	<p>Chief Officers</p> <p>Company Officers</p> <p>HazMat Techs</p> <p>Total Personnel</p>	<p>1</p> <p>1</p> <p>3</p> <p>5</p>	<p>1 HazMat Unit</p> <p>1 Foam Engine</p> <p>1 HazMat Support Unit</p> <p>1 HazMat Boat</p> <p>1 Safety Officer</p> <p>Population Served</p> <p>4,698,619</p> <p>Geographic Coverage</p> <p>1,777 square miles, includes county owned / managed facilities within the City of Houston</p>
<p>Los Angeles County</p> 	<p>Chief Officers</p> <p>Company Officers</p> <p>HazMat Techs</p> <p>Total Personnel</p>	<p>-</p> <p>8</p> <p>28</p> <p>36</p>	<p>4 HazMat Task Forces</p> <p>Population Served</p> <p>10,105,518</p> <p>Geographic Coverage</p> <p>4,751 square miles</p>
<p>New York</p> 	<p>Chief Officers</p> <p>Company Officers</p> <p>HazMat Techs</p> <p>Total Personnel</p>	<p>-</p> <p>5</p> <p>28</p> <p>33</p>	<p>2 HazMat Units</p> <p>1 Safety Officer</p> <p>HazMat Battalion</p> <p>Special Operations Command</p> <p>4 Squads (FDNY Squads are the equivalent of HazMat Engines in other departments)</p> <p>Population Served</p> <p>8,398,748</p> <p>Geographic Coverage</p> <p>468.5 square miles</p>
<p>Los Angeles City</p> 	<p>Chief Officers</p> <p>Company Officers</p> <p>HazMat Techs</p> <p>Total Personnel</p>	<p>-</p> <p>10</p> <p>24</p> <p>34</p>	<p>4 HazMat Task Forces</p> <p>6 Decontamination Units</p> <p>Population Served</p> <p>3,990,456</p> <p>Geographic Coverage</p> <p>502.8 square miles</p>
<p>Savannah</p> 	<p>Chief Officers</p> <p>Company Officers</p> <p>HazMat Techs</p> <p>Total Personnel</p>	<p>1</p> <p>6</p> <p>22</p> <p>29</p>	<p>1 HazMat Unit</p> <p>1 HazMat Support Unit</p> <p>5 HazMat Engines</p> <p>2 Rescues</p> <p>Population Served</p> <p>145.862</p> <p>Geographic Coverage</p> <p>108.7 square miles</p>




Department	On-duty Shift Personnel	Count	Equipment
	Chief Officers Company Officers HazMat Techs Total Personnel	- 2 14 16	2 HazMat Units Population Served 280,257 Geographic Coverage 113.75 square miles
	Chief Officers Company Officers HazMat Techs Total Personnel	2 2 8 12	2 HazMat Units 1 Engine 1 HazMat Support Unit Population Served 2,328,419 Geographic Coverage 637.4 square miles
	Chief Officers Company Officers HazMat Techs Total Personnel -	- 2 8 10	2 HazMat Units Population Served 2,705,994 Geographic Coverage 231.4 square miles

Figure 16. Hazardous Materials Response Team Minimum Staffing Levels of Compatible Departments

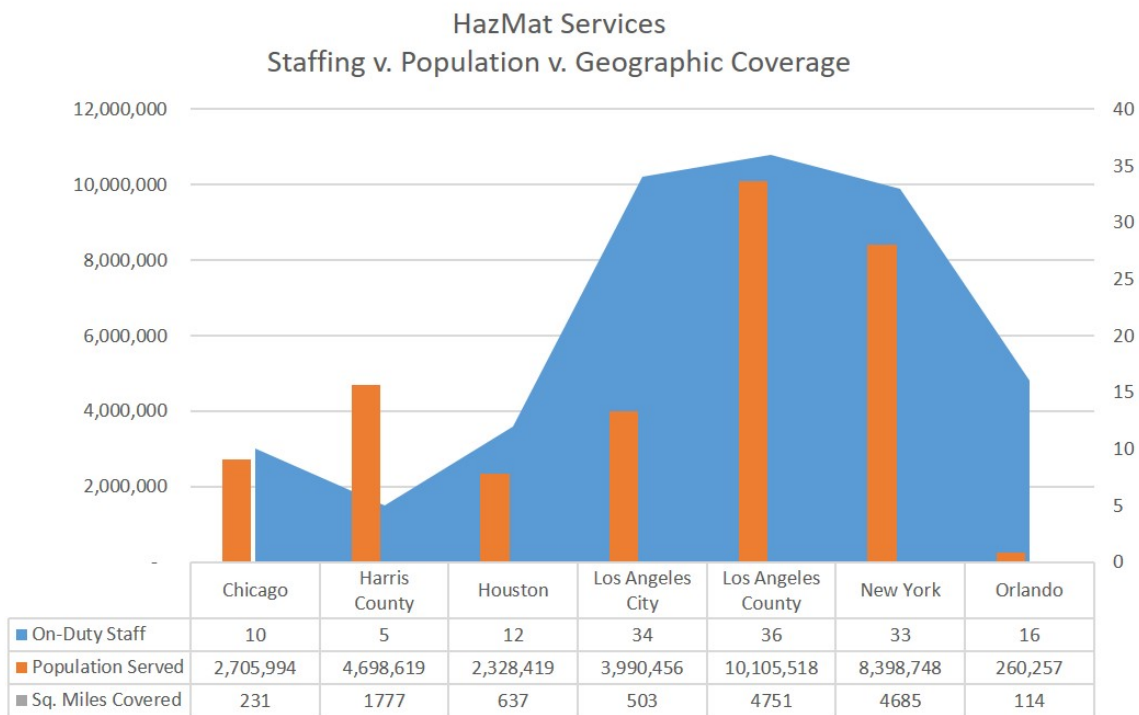


Figure 17. HazMat Services Staffing v. Population v. Geographic Coverage

Recommend that the HCFMO Hazardous Materials Response Team be fully staffed to meet the current operational capabilities of a Type-1 Hazardous Materials Response Team as defined by the Federal Emergency Management Agency. This will provide the

team with the ability to conduct multiple operational missions on large, complex incidents or the ability to respond to simultaneous incidents throughout the County without relying on mutual aid services. In order to achieve this level of service delivery, meet national recommended best practices and standards, and enable the Hazardous Materials Response Team to station a portion of their team on the west side of the County, recommend hiring the following additional personnel as shown in the following table.

Position	Count	Level	Hourly Rate	Annual Cost each	Annual Cost Total
Admin Assistant	1	Admin IV	\$ 18.91	\$ 66,226	\$ 66,226
HazMat Technician	8	HazMat Tech III	24.96	89,767	718,136
	4	HazMat Tech II	28.11	97,859	391,436
	4	HazMat Tech I	31.52	106,619	426,476
Total Estimated Annual Cost					\$ 1,602,274
<i>Note: Annual costs are fully burdened.</i>					

Figure 18. Harris County Hazardous Materials Response Team personnel needs to meet FEMA's current national standards for a Type-1 Hazardous Materials Response Team.

The proposed position description of a Hazardous Materials Technician is as follows:

HazMat Technician

General Description: A HazMat Technician is a certified task-level position that performs technician level duties in accordance with national standards and the Texas Commission on Fire Protection. The position of HazMat Technician may include the role of a peace officer if the individual holds a valid TCOLE license. A HazMat Technician reports to a HazMat supervisor and may report to other Senior Staff members depending on assignment, and may work from either office or field location, depending on work assignment. A HazMat Technician is required to maintain the required certifications as described in the requirements for the position.

General Expectations: All HCFMO personnel are expected to maintain high standards of excellence and conduct themselves in a professional manner when representing the department in any county-related activity. Personnel shall not act or behave, privately or in an official capacity, in such a manner as to bring discredit upon themselves or the Department. Personnel shall obey all federal, state and local laws.

Essential Duties and Responsibilities:

- a. Have a working knowledge of recognized standards for hazardous material response, structural firefighting, fire inspections, fire investigations, fireworks, and fire and life safety hazards, including LGC.352.016.
- b. Responds to various emergency calls including structural and environmental fires, traffic collisions, transportation emergencies, hazardous material incidents, and medical assistance within the level of training and certification for force protection only.

- c. Connects, extends, and operates hose lines and related appliances for firefighting operations including firefighting foam and other extinguishing agent applications. The individual performs search and rescue tasks, utilizing hand and power tools, hydraulic tools, portable saws, power generators, ropes, webbing, and other extrication equipment.
- d. Performs ventilation or entry operations, with the use of hand or power tools; raises, lowers, and climbs ladders to access buildings, structures, or containers and vessels; makes forcible entry into and enters burning structures or other hazardous environments.
- e. Provides medical aid to injured persons within the scope of practice that is allowed by local Emergency Medical Services or departmental authority, operates any and all related emergency medical equipment that may be provided and is allowed within the approved scope of practice.
- f. Attends and/or instructs training courses involving firefighting, medical aid, rescue, hazardous materials, equipment operation and maintenance; participates in drills and exercises; studies local conditions and factors affecting emergency response operations or emergency hazard mitigation; has a working knowledge of departmental policies, safety procedures, inspection regulations, and prevention rules; maintains physical fitness and fit for work health.
- g. If certified to do so, assists with the inspection of commercial and public buildings to ensure compliance with fire codes and inspection standards.
- h. Participates in local fire prevention programs by presenting or preparing presentations; performing station tours, and other public education activities to promote fire safety and public awareness.
- i. Ensures quality, accuracy, and timely completion of assigned tasks including program management in accordance with HCFMO policies and procedures.
- j. Performs administrative functions in accordance with policies and procedures, to include completing, reviewing and maintaining records and reports and development of summary data reports, as required.
- k. Understands and operates within an incident management system during emergency response operations and may serve as a member of an Incident Management Team during emergency or disaster situations.
- l. Maintains situational awareness of all HCFMO activities.
- m. Serves on committees, boards, councils, commissions, or other teams as assigned by the Fire Marshal.
- n. Performs assigned tasks safely, documents and reports initial accidents, injuries, or health exposures in accordance with accepted safety practices and HCFMO policy.
- o. May be assigned to any HCFMO division and perform other duties as directed by a supervisor or senior staff member.

The duties listed above are not meant to limit the assignment of work, nor should they be construed as a complete list of the many duties normally performed, or list all duties that may be performed temporarily outside an employee's normal line of work

Requirements

Education, Training, and Experience

Possess any combination of education, experience, and training equivalent to the following:

- High School diploma or GED.

License and Certifications

- At the date of hire, possess a valid license driver's license, State of Texas Class C.
- At the time of appointment as a HazMat Technician, shall be certified by the Texas Commission on Fire Protection ("TCFP") as a Structural Firefighter and HazMat Technician.
- At the time of appointment, possess a valid driver's license, State of Texas ClassB https://www.tcfp.texas.gov/certification/certification_requirements.asp.
- Within one year of appointment, provide proof of completion for NIMS IS-700, IS-800, IS-100, IS-200, ICS-300, ICS-400.
- If a licensed peace officer be Certified by the Texas Commission on Law Enforcement <https://www.tcole.texas.gov/content/career-texas-law-enforcement>

One and Two-Year Recommendations

- Given the significant hazards and risks found within the county and region, the ongoing expectation for the Harris County Fire Marshal's Hazardous Materials Response Team to support multiple municipalities throughout the region, Harris County has determined that a Type-1 HMRT operational capability is required.

Based upon the national-level resource typing standards found in the latest FEMA Resource Typing (<https://rtlt.preptoolkit.fema.gov/Public/Resource/View/4-508-1248>), a Type-1 HMRT unit should be staffed with a minimum of 8 personnel.

Current Harris County HMRT staffing levels are five on-duty personnel per shift (four team members supported by an on-call Safety Officer); however, minimum staffing levels can drop to three based upon availability of personnel. Recommend adding two additional Hazardous Materials Technicians per shift in current fiscal year and an additional two Hazardous Materials Technicians per shift in next fiscal year.

In addition, the Administrative Specialist mentioned above will provide needed support for the Harris County HMRT.

Foam Engine



Figure 19. Harris County Hazardous Materials Response Team Foam Engine (HM-2).

The HCFMO Foam Engine (HM-2) is an 11-year old apparatus and lacks the Class B foam pumping capacity to meet both current and future operational requirements posed by large flammable liquid emergencies. During the Second 80's Incident at ITC, the foam pump failed at a critical moment in firefighting operations and created a significant life safety risk to HCFMO HazMat personnel.

- Given its age and limited capacity, the unit needs replacement. The HCFMO Hazardous Materials Response Team's foam engine should be replaced with a foam delivery apparatus capable of delivering 2,000-2,500 GPM of finished foam solution and have a Class B foam concentrate tank capacity of 750 gallons. It is recommended that a comprehensive scope for this apparatus be developed and presented to Harris County Commissioners' Court.

Immediate Recommendations

Recommend that the Harris County Fire Marshal's Office develop comprehensive specifications for a replacement engine that can delivering/flow 2,000-2,500 GPM of foam with a Class B foam concentrate capacity of 750 gallons. Specifications should be developed for an apparatus with a 12-15-year lifecycle and to keep final total cost of procurement under \$1,250,000. Recommend specifications be finalized for presentation at a future Harris County Commissioners' Court Meeting. If approved, the current Foam Engine should be retained and maintained as a back-up/reserve vehicle.

One-Year Recommendations

Recommend that Harris County Commissioners' Court approve the purchase of a replacement Foam Engine as soon as practicable (specifications developed above under the Immediate Recommendation). Delivery of the Foam Engine should be as soon as possible.

Senior Management Consideration

The Harris County Fire Marshal's Office is not staffed to maintain continued long-term incidents with current Chief Officers that support emergency operations. The Assistant Chief of Operations and Assistant Chief of Operational Support are currently functioning as a de-facto Chief Financial Officer and Chief of Staff for the Fire Marshal as an additional duty. Each Assistant Chief is also required to provide on-scene and emergency operations center support in addition to their normal assigned duties. As of June 2019, the Fire Marshal has proactively requested funding to fill this critical staffing gap, but a gap continues to exist for the Assistant Chief of Operational Support.

HCFMO Training Division Support

The HCFMO provides hazardous materials and incident management training both internally for all county agencies, including the nine county law enforcement agencies, and externally for regional partners, *i.e.* fire departments, EMS agencies, law enforcement agencies, public works departments, public health agencies, and other first responders. As identified during recent incidents, the need to ensure a standard of training for response entities in Harris County is critical not only for their safety but also in the efficiency of services they are intended to provide. The Harris County Fire Marshal's Office Training Division, under updated statutory authority of LGC 352.019(e), a County Fire Marshal's Office may provide training programs to all public safety-first responders. Due to the dual certification role (law enforcement and fire service) of the Fire Marshal's Office, the agency is better positioned to provide enhanced training to Harris County response entities regardless of public safety service provided.

Recommend appointment of two additional Training Specialists to assist in training all County response entities in hazardous materials awareness, incident command, and other identified gaps to ensure quicker, safer responses by all public safety entities. Their assigned role would be to provide response training through hands-on delivery and computer-based distance learning to public safety responders throughout Harris County. The estimated cost of these training positions is shown below in Figure 19.

Position	Count	Level	Hourly Rate	Annual Cost each	Annual Cost Total
Training Specialist	2	Training Specialist I	\$ 31.52	\$ 136,619	\$ 273,238
Total Estimated Annual Cost					\$ 273,238
Note: Annual costs are fully burdened.					

Figure 20. Proposed Training Positions

Two-Year Recommendations

- Recommend hiring two additional personnel for the Training Division.
- Recommend developing job description and advertising for positions as soon as possible with the intention of having personnel on board by the end of the year.

Facility Inspections and Staffing Levels

Prior to 1 September 2005, there was no fire code in unincorporated Harris County, therefore there were no commercial building standards enforced. Under LGC 233.061, a county in the State of Texas may only adopt a national recognized fire code, they are not authorized to adopt a building code. The IFC Building Code if referenced in the fire code shall be used, yet only if referenced. In addition, this code can only be used for new construction or substantial improvement as defined, therefore any existing facility will be referenced in Chapter 11. The only building inspection of a commercial facility for new construction is performed by the Harris County Fire Marshal as defined in other state statutes as the Fire and Life Safety Enforcement Authority. Harris County has updated the current fire code from the International Fire Code, 2012 edition to the International Fire Code, 2018 edition, scheduled to go into effect in September 2019. In addition to the new version the addition of adopting the entire code, including Chapter 1 and Chapter 11, will now allow for additional fire and life safety inspection operations. On 1 January 2020 the section of Chapter 1 that will allow for operational permits will be instituted for the first time in unincorporated Harris County. This means that facilities that were built prior to any fire code adoption will be held to a standard requiring operational permits. Details can be found at:

https://codes.iccsafe.org/content/IFC2018/CHAPTER-1-SCOPE-AND-ADMINISTRATION?site_type=public

The significance of the adoption of the Harris County Fire Code that goes into effect in September 2019 and January 2020 is that for the first time HCFMO can establish criteria for operational permits that will require reporting of standard and code referenced safety practices including fire code and nationally recognized safety standards such as Risk Management Plan (RMP) and Process Safety Management (PSM) from facilities that house hazardous materials, operate a process, and those that have tank facilities. HCFMO inspections will be responsible for review and approval of operational permits. This information will be made available as read only to local fire departments through the agency emergency reporting software. This will allow first responders, including HCFMO's Hazardous Materials Response Team, to perform pre-incident plans as found in the NFPA Standard <https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1620>

As this is a first-time adoption for Harris County, it will require significant outreach through public education with builders, commercial facility partners, and local groups to ensure they are aware of the requirement. HCFMO is working with various partners to ensure a clear understanding of the code intent. This will be a process that will take time to determine how to rank the information on a risk-based criterion that determines whether an inspection is needed.

- It is anticipated that staffing will need to be increased in both the Fire Prevention and Emergency Operations divisions to meet the needs for life safety throughout the 1,777 square miles of Harris County, as compared to the 637.4 square miles of territory within City of Houston limits. See Figure 20 for a comparison of Fire Marshal Staffing levels.

Job Title		Number of Personnel		Required Certifications	
HFD	HCFMO	HFD	HCFMO	HFD	HCFMO
Chief Investigator	Deputy Chief Investigator	6	1	TCFP Arson Investigator TCOLE Peace Officer	TCFP Arson Investigator TCOLE Peace Officer
--	Captain	--	1		TCFP Arson Investigator TCOLE Peace Officer
Senior Investigators	Lieutenant	9	4	TCFP Arson Investigator TCOLE Peace Officer	TCFP Arson Investigator TCOLE Peace Officer
Arson Investigator	Arson Investigator	54	14	TCFP Arson Investigator TCOLE Peace Officer	TCFP Arson Investigator TCOLE Peace Officer
Chief Inspector	Deputy Chief Inspector	7	1	TCFP Fire Inspector	TCFP Fire Inspector
--	Captain	--	1	--	TCFP Fire Inspector
--	Lieutenant	--	4	--	TCFP Fire Inspector
Senior Inspector	Senior Inspector	15	2	TCFP Fire Inspector	TCFP Fire Inspector
Fire Inspector	Fire Inspector	102	25	TCFP Fire Inspector	TCFP Fire Inspector
HazMat Response	HazMat Response	43	16	TCFP Structural Firefighter, HazMat Technician	TCFP Structural Firefighter, HazMat Technician

Figure 21. Comparison of Fire Marshal's Office authorized staffing levels: City of Houston and Harris County.

Prevention Division

As noted during recent incidents, there is a need to identify and gather data on the existing hazardous occupancies in Harris County. The new county fire code will allow for operational permits, yet additional fire and life safety certified inspectors are needed to focus on identifying and developing the data collection that will allow first responders the ability to know what is at the facilities and to preplan accordingly.

Two-Year Recommendations

- Recommend two additional inspectors and one additional administrative assistant to address hazardous materials verification of locations, prior inspections, prior fire, law

enforcement, or HCFMO response. See Figure 21. This will enable determination of the highest risk occupancy based on previous incidents to ensure Harris County residents are made safer through inspections, communications with other first responders, and enforcement of required standards.

Position	Count	Level	Hourly Rate	Annual Cost each	Annual Cost Total
Admin Assistant	1	Admin IV	\$ 18.91	\$ 66,226	\$ 66,226
	1	Inspector II	28.11	97,859	97,859
	1	Inspector I	31.52	106,619	106,619
Total Estimated Annual Cost					\$ 270,704
<i>Note: Annual costs are fully burdened.</i>					

Figure 22. Proposed Prevention Positions

Capabilities

PENTA analyzed the capabilities of the Harris County Fire Marshal's Office and noted the following:

Common Operational Picture

One of the most pressing issues during recent events was a perceived inability to develop and share a common operational picture that was usable by responders in the field, emergency managers at the Emergency Operations Center, Joint Information Center, and by elected leaders. The need to effectively acquire, analyze, and share accurate and timely information is critical for incident management (in the field) and emergency management (at the EOC). It is also critical that key decision makers, such as elected leaders, as well as external stakeholders, such as the media and the general public be apprised of the most current and accurate information available.

The Harris County Fire Marshal's Office has taken the lead in testing an Incident Management Software System available through a third-party vendor.

Immediate and One-Year Recommendations

- Recommend that no later than 12 months, primary county stakeholders be afforded the opportunity to assess the capabilities of common operational picture display systems in order to determine if there is a system which best meets the current and emerging needs of Harris County that can be used across the spectrum of agencies to share a common operational picture.
- Once a determination is made, a specification can be developed no later than 6 months for Harris County Commissioners' Court to consider within the fiscal year.
- For this purpose, primary county stakeholders include the County Judge's Office, all four Commissioners' Precincts, Harris County Office of Homeland Security and Emergency Management, the Harris County Fire Marshal's Office, Harris County

Public Health Department, Harris County Pollution Control, Harris County Flood Control, Harris County Sheriff's Office, and each of the eight Precinct Constables. The Universal Services Department should be invited to have representatives present during this review.

- Commercial off-the shelf technology should be assessed for functionality and cost. Presentations could take the form of side-to-side comparisons, scenario-based simulations like those used in a Homeland Security Exercise and Evaluation Program, or through individual presentations.

Unmanned Aircraft Systems (UAS)

- The HCFMO Hazardous Materials Response Team should leverage available and emerging technology for emergency reconnaissance and situational awareness. This could be done by expanding the utilization of available Unmanned Aircraft Systems (UAS) as incident reconnaissance platforms.

UAS are a low-cost option that can keep personnel out of hazardous environments. They are immediately deployable as an emergency response asset with a proven value. Note: HCFMO has a plan in place to fund and deploy UAS assets. This should be leveraged so that future technology such as atmospheric air monitoring can be added to potentially provide real-time air monitoring results and inform the public and key stakeholders. *NFPA 2400: Standard for Small Unmanned Aircraft Systems Used for Public Safety Operations* details the minimum requirements for the safe operation, deployment, and implementation of UAS including organization program criteria and considerations, professional qualifications for safety personnel, and elements of a maintenance program.

Facilities

PENTA analyzed the facilities of the Harris County Fire Marshal's Office and noted the following:

HCFMO Hazardous Materials Response Team Geographic Coverage

The HCFMO Hazardous Materials Response Team covers all 1,777 square miles of Harris County from its station in Atascocita. While the facility is adequate, it does mean that it may take over an hour to get to an incident site on the west or southwest portions of the county. In addition, all county owned, operated, and managed areas within the city of Houston remain the responsibility of Harris County.

One-Year Recommendations

- Recommend placing a quick response vehicle on the west side of the county, co-located at an already existing fire station capable of providing 24/7 support and that has ready access to major transportation networks.

This quick response team can use the HazMat Support Vehicle (HM-3) as its response vehicle. This unit may require some additional support equipment, but costs should be minimal. Implementing this recommendation will significantly lessen the time

needed to initiate hazardous materials response activities on the west side of Harris County. Suggest implementing this recommendation after the hiring of the first eight additional Hazardous Materials Technicians.

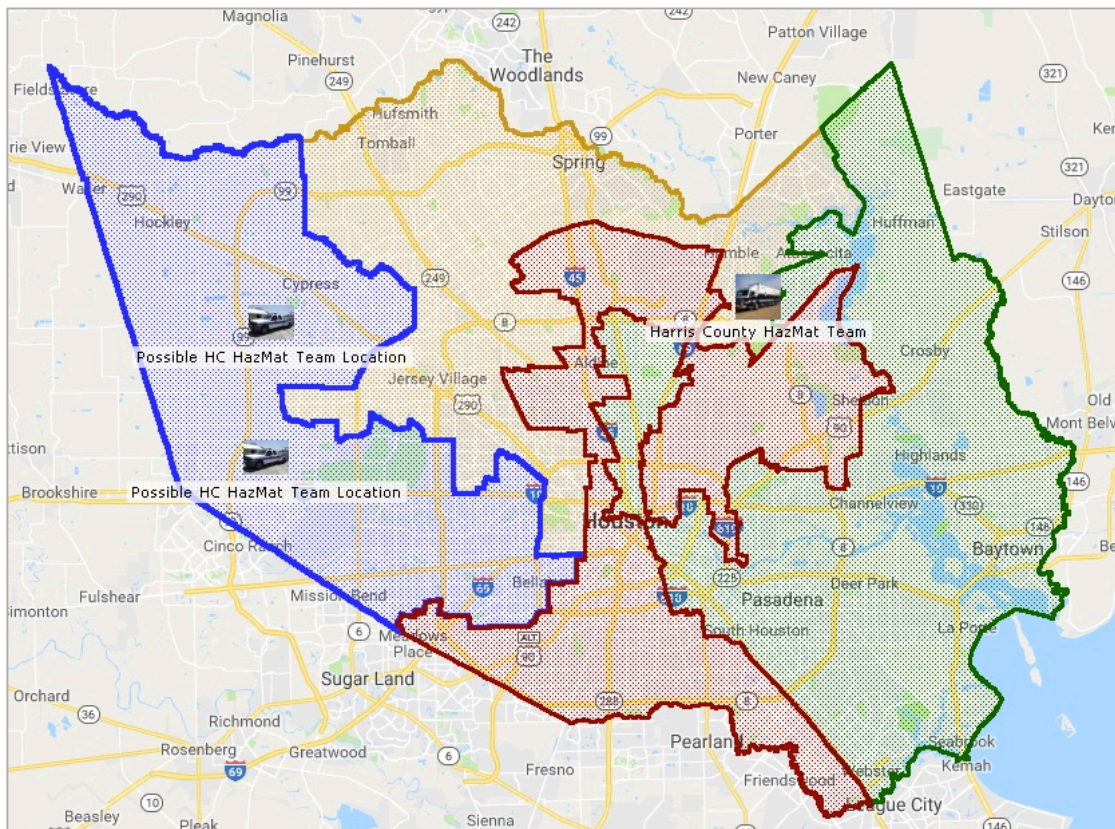


Figure 23. Current HMRT location (right) and potential substations (left).

Public Safety Training Facilities

The Public Safety Training Facilities managed and maintained by Harris County are used by almost all departments within the county in addition to additional stakeholders and response partners. These facilities are critical to maintaining the high level of training in the county and contribute to enhanced interagency interoperability through improved relationships.

Three-Year Recommendations

- The current water supply system at the Fire Marshal's Office Training Academy cannot meet current water demands and any additional increase in facility utilization. This gap includes providing the necessary water supply capacity to support the administrative office building with basic drinking and sanitary facilities, as well as increasing the training ground fire water capacity. Future facility expansion will exacerbate this problem. An engineering company should be contracted to conduct a study to determine the most cost-effective means of increasing the water supply.

- To meet current and future needs, the HCFMO Training Division needs expanded training capabilities at the Training Academy. These needs include a minimum of two permanent dedicated classrooms, equipped with audio visual equipment, computers and software to facilitate new and additional training requirements. Additional training props are needed to meet skill-based training requirements as required by national standards. This will require the assistance of architectural and engineering firms to determine construction costs.

Long Term Recommendations

- There is a future need for a Joint Public Safety Training Auditorium that seats 400 to 600 people. This new building could be designed for multi-agency utilization and applications by both HCSO and HCFMO as well as response partners and stakeholders. This will require the assistance of architectural and engineering firms to determine construction costs.

Mobile Incident Command Posts

There currently is no need for HCFMO to acquire an additional Mobile Command Post. The Harris County Sheriff's Office has a variety of mobile command posts, communications units, and generators that were acquired utilizing grant money from Department of Homeland Security. These assets are available for any Public Safety Agency requesting their use.

Harris County Public Health Department



Harris County
Public Health
Building a Healthy Community

2019 Harris County Public Health CHEMICAL RESPONSE

PURPOSE/SCOPE



There may be incidents in which a chemical emergency threatens the health and safety of Harris County residents. During a chemical response, Harris County Public Health's (HCPH) role is to protect the health and well-being of the broader community and to coordinate, and/or assure the medical response system is responding with appropriate resources.

In such a situation, HCPH may be activated to assist and its divisions/offices or programs will assist with:



Monitoring community health



Assist with communication in the Harris County Joint Information Center (JIC)



Coordinating health/medical management for congregant sheltered persons



If warranted, HCPH may monitor drinking water, food establishments for the protection of public health



Responder safety and health



If warranted, HCPH may monitor impact on pet welfare (cats and dogs)



Disease surveillance (epidemiology) and data analyses



Advise Harris County elected officials and response partners of any potential adverse health effects

SETTING THE OBJECTIVES



Department objectives during a chemical response will be established by the HCPH Incident Commander (IC) and will be communicated to the Unified Command, if required, and to Harris County Emergency Operations Command (HCEOC) at Harris County Office of Homeland Security and Emergency Management (HCOHSEM).

Objectives would be based on current conditions as they unfold, and can be modified and adapted, as needed, to meet the response needs of the community.

OPERATIONS



The specific operational actions that HCPH would take is based on the objectives set at the time of the incident and can change depending on the event evolves.

However, regardless of the type of chemical incident, general operational guidelines for this type of response may include the following:

- Involvement of subject matter experts (SME) in the creation of communication messages provided to the public, media and stakeholders.
- Tracking and monitoring of residents who may have been exposed to the chemical in question, including the following activities:
 - Case investigation, symptom monitoring, and follow-up of individuals
 - Submitting necessary reports to internal and external partners as appropriate
- In collaboration with SMEs, recommendations for personal protective equipment (**PPE**), as needed, to be utilized during the response.
- Activation of other HCPH Emergency Response plans and Standard Operating Guides (**SOGs**) to include:
 - Department Operations Center (**DOC**)
 - Surveillance and Epidemiology Response Plan (**SOG**)
 - Crisis and Emergency Risk Communications Plan (**CERCP**)
 - Community Reception Center (**CRC**)
 - Continuity of Operations Plan (**COOP**)
 - Responder Safety and Health (**SOG**)
 - Pop-up Mobile Clinic (**SOG**)

PARTNERS



In the event of a chemical response, HCPH may coordinate with various different agencies to ensure the health and safety of Harris County residents. This list is not all-inclusive, other partners may be added as the situation evolves.

- *Centers for Disease Control and Prevention Agency for Toxic Substances and Disease Registry (**CDC/ATSDR**)*
- *Harris County Pollution Control (**HCPC**)*
- *U.S. Department of Health & Human Services, Assistant Secretary of Preparedness and Response (**HHS/ASPR**)*
- *Harris County Fire Marshal's Office (**HCFMO**)*
- *Texas Department of State Health Services (**DSHS**)*
- *Harris County Office of Homeland Security and Emergency Management (**HCOHSEM**)*
- *Texas Poison Control Network (**TPCN**)*
- *Southeast Texas Regional Advisory Council (**SETRAC**)*
- *University of Texas Safety, Health, Environment, and Risk Management (**UT-Health**)*
- *Harris Center for Mental Health and IDD (**HCMHIDD**)*
- *Harris Health System (**HHS**)*

Harris County Public Health Department (HCPH)

Mission

Promoting a Healthy and Safe Community, Preventing Illness and Injury, and Protecting You. Building a Healthy Community.

Overview

The Harris County Public Health Department (HCPH) is responsible for managing a wide array of services for the residents of Harris County both on a daily basis as well as in ensuring the health, well-being, and safety of the community during public health emergencies.

As background, HCPH is the county health department for the Harris County jurisdiction and provides comprehensive health services to the community through the work of 700 public health professionals – all dedicated to improving the health and well-being of Harris County residents and the communities in which they live, learn, work, worship, and play. HCPH as an agency lags behind in per capita local funding compared to many other local health departments its size within Texas. The HCPH was recognized in 2018 as an accredited health department by the Public Health Accreditation Board (PHAB) and was named the 2016 Local Health Department of the Year by the National Association of County and City Health Officials (NACCHO).

In the area of emergency preparedness, response and recovery, HCPH is sought out nationally and statewide for its expertise in public health emergencies. In 2015, the department achieved another emergency response milestone upon receiving the Project Public Health Ready certification – one of only two public health departments in Texas at that time to receive this recognition. In 2018, HCPH received overall departmental accreditation being one of only a select few public health departments across Texas to receive this designation. HCPH has also been recognized nationally for its work in community engagement, outreach, and infectious disease response.

The Department is made up of five divisions and five offices (with major functional programs or responsibilities listed):

- Disease Control and Clinical Prevention Division – Family and Community Medicine; Clinical Preventive Services (Immunizations, Family Planning and Women’s Health, Oral Health, Refugee Health Screening, Tuberculosis Prevention and Control).
- Environmental Public Health Division – Built Environment and Healthy Community Design; Health Impact Assessments; Food Safety; Pool Safety; Public Drinking Water Safety; Lead Screening and Abatement; Healthy Homes; Neighborhood Nuisance Abatement.

- Mosquito and Vector Control Division – Mosquito and Avian Disease Surveillance; Insecticide Resistance Monitoring; Mosquito and Vector Control; Emerging Technologies for Applied Research and Data Analytics.
- Nutrition and Chronic Disease Prevention Division – Women Infants and Children (WIC) program; Worksite Wellness; Behavioral Health Prevention; Oral Health; Asthma Education; Chronic Disease Prevention; Chronic Disease Self-Management; Obesity Prevention; School Health, Mobile Health Impact Teams.
- Veterinary Public Health Division – Zoonotic Diseases; Rabies and Rabies Risk Assessment; Animal Bite Prevention; Animal Adoption and Wellness Services; Shelter Medicine and Veterinary Medicine.
- Office of Communication Education and Engagement – Health Communication; Crisis Risk Communication; Health Education and Promotion; Social Marketing and Mass Media Campaigns; Community Engagement; Delivery of Culturally and Linguistically Appropriate Health Services; Coordination of Community Outreach/ “Mobile Village” Events.
- Office of Financial and Support Services – Health Innovation, Health IT and Public Health Informatics and Data Visualization; Public Health Innovation Lab; Human Resources; Work Force and Leadership Development including Lean Six Sigma; Project Management; Financial Management.
- Office of Policy and Planning – Health Policy and Advocacy; Health Equity; Public Health Accreditation: Evaluation and Quality Improvement; Strategic Planning; Coalition Building and Collective Impact; Community Health Improvement Planning; Systems Transformation; Health Care Systems Integration.
- Office of Public Health Preparedness and Response – All-Hazards Planning, Response and Recovery for Public Health Emergencies; Community Resilience; Community Assessment for Public Health Emergency Response (CASPER) activities; Harris County Public Health Emergency Management Coordination.
- Office of Science Surveillance and Technology- Surveillance, Community Statistics/Data Warehouse and Epidemiology; Health Technology and Innovation; Research and Science.

Major Emergency Response Strategic Partnerships

- Regional/Local
- Harris County Medical Society (HCMS)
- Texas Medical Center (TMC)
- Greater Houston Partnership
- Urban Area Security Initiative (UASI)
- Regional Hospital Preparedness Council (RHPC)
- Southeast Texas Regional Advisory Council (SETRAC)
- Academic Institutions

- Texas/State
 - Texas Department of State Health Services (DSHS)
 - Texas Association of City and County Health Officials (TACCHO)
 - Texas Disaster Medical System (TDMS)
 - Texas Environmental Health Association (TEHA)
 - Texas Medical Association (TMA)
 - Texas Public Health Association (TPHA)
 - Texas Public Health Coalition (TPHC)
 - Texas Governors Infectious Disease Taskforce
- Federal/National
 - American Public Health Association (APHA)
 - National Environmental Health Association (NEHA)
 - National Academies of Sciences, Engineering, and Medicine (NASEM)
 - U.S. Food and Drug Administration (FDA)
 - U.S. Department of Health and Human Services (HHS)
 - Centers for Disease Control and Prevention (CDC)
 - Office of Assistant Secretary for Preparedness and Response (ASPR)
 - U.S. Department of Homeland Security (DHS)
 - Countering Weapons of Mass Destruction (CWMD)
 - Homeland Security Consortium
 - National Association of County and City Health Officials (NACCHO)
 - Preparedness Policy Advisory Group
 - Medical Countermeasures Workgroup
 - Radiation Workgroup
 - Risk Communication and Information Sharing Workgroup
 - Bio-surveillance Workgroup
 - Preparedness Planning, Outcomes, and Measurement Workgroup

Contact: 2223 West Loop South
Houston, TX 77027
(713) 439-6000

Department Gap Analysis

The Gap Analysis noted that during the Second 80's Incident at ITC, services that would typically be the responsibility of the Harris County Pollution Control Services (HPCPS) were instead conducted and led by Harris County Public Health (HCPH). After inquiring about what seemed to be an overlap of services, it was determined that HCPH took on these roles at the request of elected officials.

As a result of the rapid expansion of the fire and subsequent concerns of the Harris County residents for their health and safety, HCPH adopted a focus of response, requiring staff to transition from their routine duties to emergency response duties and responsibilities.

Although routine health related services continued, many of the staff were reassigned into emergency response roles, some of which were non-familiar duties, as often takes place during disasters. One of the most notable was the responsibility of conducting air quality monitoring.

In reviewing HCPH's Emergency Operation Plan (EOP) there are several references to "detection." After further interview, Public Health contends that the word "detection" within the HCPH EOP was intended to denote "Detection of communicable diseases" and not detection of chemicals in the air, soil, or water. In other words, the Air Quality Monitoring that was conducted during the Second 80's incident was not typically within the area of responsibility of Public Health. However, monitoring population health during and following an exposure is the responsibility of HCPH.

In 2011, Harris County Pollution Control Services (HCPCS) became a separate county agency while HCPH continued to retain some environmental public health responsibilities (e.g. drinking water, food safety, neighborhood nuisance, etc.). This previous merger as well as the often inter-connectedness of environmental-related subject matters involving certain aspects of the two agencies may have led to the apparent confusion from outside officials concerning the roles and responsibilities of the two departments.

Although Public Health focuses on the health and well-being of the Harris County residents and Pollution Control's focus is on environmental impact when chemicals are released, there remains a need for both to work closely together especially in times of disaster involving chemical releases. Dedicated efforts should be committed to addressing roles of each department during a chemical response in the future. Most importantly, HCPH and HCPCS should work together to develop an understanding of relationship and responsibilities in developing and implementing an effective Community Air Monitoring strategy led by HCPCS to ensure the safety of County residents.

While HCPH has comprehensive sets of plans and protocols that are adopted and adapted by other public health agencies across the country, Harris County Public Health's Emergency Operations Plan needs more added on HCPH's role during a chemical response, something that the Harris County Office of Homeland Security and Emergency Management can assist with.

Like many other organizations, Harris County Public Health should also continue to use available trainings offered through PreparingTexas.org, the Harris County Office of Homeland Security and Emergency Management, Harris County Fire Marshal's Office, and other sources. In addition, it is recommended to provide a clear delineation between the terms "detection" and "monitoring" in the HCPH EOP to make it clearer to external entities outside of public health. Where appropriate within the HCPH EOP, HCPH should define the word "detection" to indicate that this role is the detection of disease, illness, or injury and not meant to be the detection of chemicals in Air, Soil, or Water.

Improvement involving personnel and equipment, as well as training to build further emergency response capacity especially for chemical events in a timely and effective manner, will require substantial resources.

Plans

Prior to and after conducting on site interviews the team reviewed the following primary emergency response plans, procedures, and information listed below:

- Harris County Emergency Operations Plan (2015). Approved by the Harris County Judge and the incorporated mayors of the cities within Harris County. Includes the legal authority for the plan. Defines the differences between emergencies, incidents, and disasters. The Plan requires revision every five years with some Annexes updated more frequently. The Plan includes Annexes A–W, with the most recent revisions.
- HCPH Emergency Operations Plan (February 2019). Harris County Public Health employs an Emergency Operations Plan (EOP) to guide incident response efforts. The plan is reviewed annually and was updated just prior to the Second 80's Incident. The plan is approved by the Executive Director of Harris County Public Health (HCPH). It includes the legal authority for the plan. It defines what constitutes an emergency, and incident, and a disaster. The Plan requires annual revision and falls under Annex-H of Harris County Emergency Operations Plan. Harris County's Operational Plan includes a list of the associated Appendices and the date of their most recent revision. The HCPH Emergency Operations Plan is listed under Annex H: Health and Medical Services (2019).

Gaps

- The Department's 2019 Emergency Operations Plan does not clearly define the department's roles and responsibilities during hazardous materials incidents.
 - It does not include an appendix or standard operating procedures for how Public Health will respond during a hazardous materials incident regarding chemical exposure. Specifically, the plan needs to discuss roles, responsibilities, and unity of effort.
- As mentioned, Public Health was asked to assume responsibility for conducting air monitoring during the Second 80's Incident at ITC. There was some confusion as to which agency will be responsible for conducting community air monitoring (air, water and soil) and who will be responsible for communicating that information with the public throughout the incident. Currently, HCPH is responsible for health implications of a chemical response and HCPCS is responsible for the technical data.
- The EOP identifies four levels of readiness (activation) related to an emergency or a disaster. It does not specifically discuss that when there is a rapid activation, HCPH may skip or combine these levels of activation (Example: severe weather preparations for a rapidly developing storm close to shore in the Gulf of Mexico).
- Due to the previously mentioned split of HCPH and HCPCS, HCPH's Emergency Operations Plan focus is now more on transmittable diseases and not as much hazardous materials releases. It does not include triggers to identify activation steps to follow from one level to the next.
- Some sections indicate that activation level changes require the approval of the County Judge (in the role as County's Emergency Management Director) while

other sections say this change may be made at the request of the Harris County Judge and/or Emergency Management Coordinator. Recommend all sections indicate “Harris County Judge and/or Emergency Management Coordinator” for consistency.

- It should be noted that Texas law also codifies the role of the Local Health Authority (LHA) in ensuring the health protection of a community. This role must be taken into consideration during public health emergency response. The HCPH Executive Director as a physician also currently assumes the role of LHA for Harris County.
- HCPH's 2019 EOP needs to reference an Annex or an SOP that will address focused support for the following in the event of a hazardous materials incident:
 - Community Health Monitoring
 - Community Potable Water Sampling
 - Community Radiological Monitoring
 - Chemical exposure screening

One-Year Recommendations

- Recommend the hiring of at least one planner for chemical, nuclear, radiological response. Among other duties, this person or persons can:
 - Evaluate and update current plans to meet the needs of a Public Health response to a chemical or radiological incident affecting Harris County.
 - Identify gaps in response planning for chemical and radiological incidents.
 - Assist in the immediate update of policies, plans, and procedures identified in the gaps of this document.
 - Keep up with the ever-changing federal requirements for public health response for chemical and radiologic efforts.
- Recommend the hiring of at least one Medical Reserve Corps (MRC) Planner. Among other duties, this person or persons can:
 - Assist HCPH MRC coordinator with chemical, nuclear, radiological response volunteer recruitment and activation
 - Conduct annual trainings to volunteers
 - Assist with credentialing of medical volunteers
- Recommend revising this department-level plan, with assistance from Harris County Pollution Control, to minimize duplication of effort. Include a Community Monitoring Plan/Strategy as part of the plan (may require subject matter assistance of HCFMO Hazardous Materials Response Team). This should be able to be accomplished with minimal funding.

Training and Competencies

HCPH conducts a myriad of public health activities including programs, health assessments, and education to improve the overall health of the residents of Harris County. On a day-to-day basis this department functions with great efficiency and provides excellent services. They are also responsible for responding to emergencies, incidents, disasters, and other catastrophic events to ensure health and safety and to protect the public from injury, illness, and exposures. It has been recognized nationally

and statewide for its public health emergency planning, training, and exercises activities as well as its response roles as well.

Gaps

- As with other departments analyzed as part of this Gap Analysis, there is a need for additional and updated NIMS Incident Command System training. While there is an established Multi-Year Training and Exercise Plan in place, some new employees, including management staff, are in need of ICS training.

One-Year Recommendations

- Recommend department personnel continue to avail themselves of training offered through [PreparingTexas.org](https://www.preparingtexas.org), the Harris County Office of Harris County Fire Marshal's Office, and other sources.

Resources

Harris County Public Health can mobilize some of its services and resources into the community through its "Mobile Health Village" concept. These can include health and wellness check-ups (e.g. immunizations, dental health, pet care, health screenings, etc.) and education (e.g. nutrition, pet care, mosquito prevention, lead poisoning, environmental health, etc.).

Following Hurricane Harvey in 2017, HCPH has utilized the Mobile Health Village in many innovative ways. This flexibility has expanded their outreach and engagement with the residents of Harris County. In addition, HCPH often partners with community organizations and other county departments to participate in many Mobile Health Village events by providing information and services.

Gaps

During an emergency, HCPH's focus and scope changes to an emergency response mindset. Having appropriate personnel and resources in place or identified is critical to the success of the emergency response. Although HCPH's Mobile Health Village is not designed to provide acute medical care, at the county's request, the mobile health team shifted to provide urgent care type health screenings during the Second 80's Incident.

To provide some limited health assessments to the affected community, components of the HCPH Mobile Health Village were requested and deployed to assess the health concerns of residents in Deer Park and Galena Park, TX. These health assessments were provided within a facility within proximate communities to accommodate the large number of residents expected. It was augmented by the addition of HCPH mobile units to provide privacy to any resident receiving further medical evaluation.

In conjunction with Harris Health System, the county's indigent healthcare delivery provider, Harris County Public Health provided direct medical care, emergency services, and health assessments performed by nurses, mid-level providers, and physicians on

site. In addition, HCPH partnered with Harris Center for Mental Health and IDD to provide mental health services.

Again, the Mobile Health Village was not originally designed nor intended to be used for assessing chemically exposed patients yet pivoted to fill an emergency response need that had been requested. It is noted that some of the basic medical screening provided was successful in identifying other health issues that were unrelated to the Second 80's Incident that required definitive medical care. If individuals presented themselves requiring higher-level of services other than health screenings, providers routed individuals via transport services to the nearest medical facility.



Figure 24. Mobile Health Village operating following Hurricane Harvey.

While Harris County Public Health might have personnel for day-to-day assignments, any significant emergency will put a strain on its department. If there are not enough personnel available to respond to an emergency, other tasking will naturally be made a lower priority. Due to the large number of services that are provided by Harris County Public Health, these may need to be prioritized by Department leadership.

Immediate Recommendations

- Recommend evaluating how to more effectively utilize this Mobile Health Village concept during hazardous materials exposure events, so that it may provide advanced medical screenings and monitoring post exposure when medically necessary based on the information available to the Local Health Authority at the time. This can be accomplished with minimal cost and effort within a 3-month period.

One-Year Recommendations

- Recommending hiring at least one Certified Industrial Hygienist (CIH) with a toxicology background within a 12-month period. Among other duties, this person or persons can:
 - Provide detailed information on the chemical, physical, and toxic properties of chemicals involved in an incident,
 - Assist in identifying downwind hazards and threatened populations,
 - Serve in the Community Monitoring Group as the Environmental Health Technical Specialist discussed under the One-Year Recommendation, and
 - Assist the Joint Information Center on the development of critical messaging efforts directed at residents or the news media.
- Recommend hiring at least one Industrial Toxicologist within a 12-month period. Among other duties, this person or persons can:
 - Identify immediate action levels during an emergency event involving a chemical release.
 - Identify health issues and health screening tools depending on the chemical hazard.
 - Serve as an advisor to the Public Health Medical Director for chemical related events that threaten the public's health.
 - Assist as a subject matter expert to the Joint Information Center.

Capabilities

With expansive service lines or products, the Harris County Public Health Department undoubtedly has a plethora of capabilities that serve the needs of the residents of Harris County. The complex nature of incidents that have occurred and may occur within Harris County make it imperative that County agencies with response duties maintain a broad spectrum of capabilities in order to safeguard the residents of Harris County.

Gaps

- Community Air Monitoring was a critical gap during the Second 80'S incident. HCPH was identified as the lead agency for conducting air monitoring during the incident and to advise the county leadership on sampling data for decision-making actions. During the incident the limited resources of the Fire Marshal's Office were focused on response efforts (Example: on-scene emergency operations vs. off-site public protective actions). There were insufficient resources to focus on the off-site safety issues to ensure the safety of the residents of Harris County. Initial air monitoring resources deployed were contractors working for the Responsible Party. This introduced a perceived conflict of interest between local government and the responsible party and their contractor. Because HCPH does not have the subject matter expertise to collect and analyze this type of data, additional resources, including the Houston Fire Department, the 6th Civil Support Team, Texas Interstate Fire Mutual Aid System resources, and a County-contracted industrial hygienist provided the additional air monitoring support needed to safeguard the residents of

Harris County. Resources provided by the EPA and the Texas Commission on Environmental Quality were also limited, but at least accessible, if not always timely in nature.

- HCPH working with other partners (e.g. The University of Texas School of Public Health, the Poison Control Center at The University of Texas Medical Branch at Galveston, and even nationally through the Center for Disease Control (CDC) and Agency for Toxic Substances and Disease Registry (ATSDR), etc.) determined there was “no medical reason to conduct biological testing for benzene.” Due to the limited time and range of exposure, after reviewing the information, CDC/ATSDR found that medical testing was not warranted based on scientific data.
- There is a need for laboratory or (human) chemical testing in the future. Harris County Public Health does not have a large number of staff trained in assessing individuals exposed to hazardous materials nor is there a protocol developed to determine the appropriate means to identify if a person was exposed. This could be done by contractors but the capabilities do not exist within HCPH.
- If this is a service that Harris County Public Health in consultation with partners deems necessary to perform, when medically necessary, it will be necessary to dedicate the personnel, time, and resources to ensure department personnel or their contractors can deliver this critical service to Harris County residents.

One-Year Recommendations

- To provide the service needed to safeguard the county residents, Harris County needs to develop and employ a chemical response plan, such as that listed in the Resources, One-Year Recommendations. To accomplish this recommendation, the hiring of a chemical, nuclear, radiological response planner as identified in Resources and Immediate Recommendation should be completed.
- Recommend that Harris County Public Health review its procedures to determine if there is guidance to determine if an individual has been exposed. If there has been an exposure, assess and evaluate the individual for additional monitoring or medical intervention. As part of this effort, exposure records will need to be maintained and be available to the appropriate medical or legal authorities. To accomplish this recommendation, the hiring of an Industrial Toxicologist as identified in Resources, One-Year Recommendation should be completed.
- Recommend hiring at least one Occupational Medicine Physician. Among other duties, this person or persons can:
 - Recommend training needed for HCPH staff regarding hazardous materials and health assessments
 - Identify health issues and health screening tools depending on the chemical hazard.
 - Serve as Subject Matter Expert for chemical response plan and operations.
 - Serve as an alternate local public health authority
 - Serve as an advisor to the Public Health Medical Director for hazardous material related events

- Recommend hiring at least one public health physician with expertise in emergency response. Among other duties, this person or persons can:
 - Review and advise on chemical, nuclear, radiological, and other hazardous response planning and operations for public health
 - Recommend and oversee medical response training requirements and activities
 - Work with medical partners (e.g. Harris Health, Harris County Medical Society, etc.) in collaborations during emergency responses

Facilities

The Mobile Health Village was reviewed under the Resources section above. There were no facility gaps identified.

Memorandums of Understanding are in place for use during disasters or emergencies. These include the use of schools in 21 school districts and numerous Community Centers through the County Commission Court. These facilities can be used for community health efforts depending on the need. These facilities were not utilized during the Second 80's Incident.



Figure 25. County Judge Lina Hidalgo, Dr. Umair Shah, MD and Mayor Turner at a press conference at the Harris County Emergency Operations Center during the Second 80's incident at ITC.

Harris County Pollution Control Services



Pollution Control Services



Our Mission

Ensure clean air and water for the citizens of Harris County consistent with the protection of public health, enjoyment of property and the protection of plant, animal, and marine life through monitoring, surveillance and inspection programs, and by enforcement of applicable State air, water, and solid waste regulations and the Harris County Storm Water Quality regulations.

AIR

Investigating citizen concerns regarding air quality is one of our highest priorities. In doing so, PCS enforces nuisance, outdoor burning, and facility permit requirements contained in the Texas Administrative Code. Additionally, PCS reviews air permits submitted to the Texas Commission on Environmental Quality and investigates unauthorized emission events from facilities. PCS also maintains a network of ozone monitors and partners with TCEQ to display ozone concentrations as part of a statewide monitoring network.

WATER

PCS enforces water quality regulations by investigating citizen complaints and conducting routine wastewater and stormwater inspections. Citizen complaints investigated include sewage discharges, oil spills, and fish kills. Industrial and commercial stormwater inspections are conducted to prevent unpermitted pollutant discharges into waters of the state. Periodically, samples are collected at Flood Control channels and rivers as part of a collective effort with the Houston-Galveston Area Council and TCEQ to monitor water quality.

INVESTIGATION FLOWCHART

1. Notification

PCS receives citizen complaint or initiates routine inspection. TCEQ and other agencies often refer complaints

We maintain 24-hour on-call coverage

2. Investigation

PCS gathers evidence including field observations, testimonies, photographs, and samples for PCS lab analysis

Violations are documented and written violation notices are issued to responsible parties

WASTE

Illegal dumping of trash, unauthorized disposal facilities, and hazardous spills are examples of solid waste problems in Harris County. To address citizen concerns regarding solid waste, PCS investigates complaints and routinely inspects landfills, waste transfer stations, recycling facilities, and hazardous waste generators. PCS helps ensure the proper management of solid wastes in Harris County by enforcing the Texas Solid Waste Disposal Act and the Texas Health and Safety Code.

TOXINS CONTROL

At the request of partner agencies and concerned citizens, PCS conducts environmental sampling in communities potentially impacted by exposure to hazardous substances. For instance, in 2018, PCS sampled residential drinking water wells in Crosby located in northeast Harris County following plant flooding and subsequent explosions of organic peroxides. Sampling reports are made available to the public via public meetings and our website.

3. Compliance Monitoring

PCS conducts re-inspections until compliance is obtained

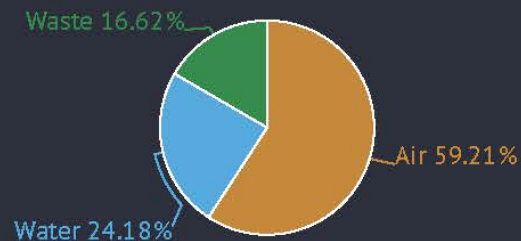
If further action is needed an enforcement meeting with responsible party is held

4. Enforcement

Severe and/or repeat offenders are referred to the County or District Attorney's office for civil or criminal enforcement

PCS personnel may testify during court proceedings

2018-2019 Complaints



INCIDENT FLOWCHART



Evaluate impact to the public and the environment



EMERGENCY RESPONSE

PCS responds to hazardous material emergencies impacting Harris County, evaluates the impact to the public and environment, and determines if regulatory enforcement is required. Incident responses include roadway spills, abandoned drums, and industrial fires. We maintain 24-hour on-call response.

Pre-Response Actions



Initiate downwind air monitoring if required

Collect samples of potentially affected water bodies

Communicate containment requirements to incident command

Monitor notifications from facilities and public complaints

Maintain readiness of ER personnel, including training

Maintain readiness of ER equipment, including calibrations

Response Actions





Communicate ongoing actions
to public and partner agencies

Post Incident



Determine clean up required,
including soil sampling needed

Determine violations of
environmental laws and issue
violation notices

Conduct follow-up investigation(s)
to ensure responsible party
obtained compliance and
completed necessary remediation

Conduct an enforcement review
to determine if further action is
required, including CAO referral

Our Partner Agencies



and others...

Harris County Pollution Control Services (HCPCS)

Mission

Ensure clean air and water for the citizens of Harris County consistent with the protection of public health, enjoyment of property and the protection of plant, animal, and marine life through monitoring, surveillance and inspection programs and enforcement of applicable State air, water, and solid waste regulations and the Harris County Stormwater Quality regulations.

Overview

The activities of the Pollution Control Services Department are directed toward ensuring clean air, ground and surface water, soil and proper solid waste management for the citizens of Harris County consistent with the protection of public health, enjoyment of property, and the protection of plant, animal, and marine life.

Activities include:

- Enforcing the State of Texas air, water and solid waste statutes and the rules promulgated thereunder by the Texas Commission on Environmental Quality (TCEQ) and the Regulations of Harris County for Stormwater Quality Management.
- Emergency Response. For clarification, HCPCS is not a first responder and does not respond with emergency response vehicles (lights and sirens). Emergency Response, which is a term used by comparable state agencies, is recognized as an urgent immediate response.
- By stating “Emergency Responders,” it is interpreted that the document is referring to the Pollution Control emergency responders and not the Fire/EMS/HM emergency responders.
- Responding to citizen complaints regarding air, water, soil, or solid waste problems or concerns.
- Monitoring, inspecting and investigating activities and facilities associated with air, water, stormwater, soil and solid waste (hazardous and non-hazardous) pollution.
- Laboratory analysis of air, water, stormwater, soil and solid waste samples to identify and quantify compounds that may be hazardous, a public nuisance or detrimental to the environment.
- Reviewing and commenting on TCEQ rules and permits (including renewals and amendments) and Environmental Protection Agency rules.
- Assessing and compiling reports and evidence relating to violations of environmental laws for civil or criminal enforcement litigation.
- Coordination and administration of Supplemental Environmental Project funds.

During the Second 80's Incident, Harris County Public Health was directed to oversee the air quality monitoring. Air quality monitoring is outside the scope of HCPH as this is an identified function of Pollution Control. It is difficult to identify the function of air monitoring as a Gap of Pollution Control because the function was directed to HCPH. The Pollution Control Services Department provides Emergency Response services to the citizens of Harris County by responding to hazardous materials incidents that affect Harris County and evaluating their impact to the public and the environment. The Emergency Response Section currently has a team of four specialists and maintains a 24-hour/day on-call coverage. Responses include fires involving hazardous materials, industrial facility releases, chemical spills, abandoned drums, and containers of unknown waste. The Emergency Response Section also responds to requests for assistance from fire departments, Hazardous Materials Response Teams, and other governmental agencies.

Contact: 101 South Richey, Suite H
Pasadena, Texas 77506
(713) 920-2831

Department Gap Analysis

The Harris County Pollution Control Services Department has experienced the greatest entropy in the last 21 years of all the departments analyzed. As with other departments, it is also in need of updates to their plans and standard operating procedures. The Harris County Office of Homeland Security and Emergency Management can provide the subject matter expertise needed to assist their peers in this endeavor. Harris County Pollution Control Services also needs to take the lead in developing, implementing and leading the effort to develop an effective Community Air Monitoring strategy capable of safeguarding the residents of Harris County. This will require substantial support for mobile and fixed monitoring stations, along with the personnel to manage and analyze the systems as well as maintain them. As the most discussed gap from the Second 80's incident, this should be the principle priority for HCPCS. HCPCS needs to work with the HCFMO and HCPH to minimize the perceived duplication of effort regarding emergency response.

Plans

The department's Standard Operating Procedure (SOP), Emergency Response Protocol, dated March 7, 2013 was signed and approved by the HCPC Director. The Harris County Pollution Control Services website lists a group of department duties. These duties are all related to compliance and compliance-related matters except for "Emergency Response." When emergency response by the department is needed, employees respond based on the Emergency Response SOP and are not using the guidance of the Harris County Emergency Operations Plan. The SOP does not identify individual roles and responsibilities as would be found on a detailed Incident Command organizational chart.

Gaps

- Considering recent events in Harris County, the Emergency Response SOP needs a comprehensive update. The current plan is six years old and is comprised largely of an outline without specific detail identify roles and responsibilities of the HCPCS staff.
- The SOP defines the response expectations to an emergency incident. Its Scope and Application indicate that their response is to “Establish a uniform protocol for how HCPCS Emergency Responders will coordinate, respond to, monitor, assist an Incident Command, document and track environmental emergency and Weapons of Mass Destruction (WMD) incidents involving releases of pollutants that occur within the unincorporated areas and any other locations within Harris County where requested.” The expected environmental emergencies that would require their response include but are not limited to “Any ongoing fire or explosion that causes a major air release or spill where offsite effects are expected.” This SOP is in an outline format and does not provide guidance concerning how these identified duties would be accomplished.
- The SOP identifies that community air monitoring will be performed downwind of an incident but does not state at what concentration actions will be taken or what actions are expected. (For example: Actions will be taken when the monitored level is at or above the Federal exposure limits and the actions will be; Shelter in Place, Evacuations; voluntary or mandatory, etc.) In addition, no guidance identifying what type of air monitoring would be accomplished or what equipment is available.

Recommendations

- Recommend that the Community Air Monitoring Plan identified in the One-Year Recommendation be incorporated into this SOP. In addition, a Community Water Monitoring Plan should also be incorporated.
- At a minimum, SOP updates should include, but not be limited to roles and responsibilities of department personnel during the emergency response phase as well as during the clean-up and recovery phase, and include a process to transition the role of Local On-Scene Coordinator from the Harris County HMRT or other Authority Having Jurisdiction (emergency response phase) to a representative of the Harris County Pollution Control Services Department which oversees the clean-up and recovery phase.

Training and Competencies

The Harris County Pollution Control Services Department investigates and inspects industries who formulate, use, or transport chemicals in the Harris County area. When an emergency, disaster, or other catastrophic incident occurs, the Pollution Control Department follows its “Emergency Response Standard Operations Procedure.” This SOP outlines Pollution Control’s response procedures. In this document, the department’s scope during a hazardous materials release is to monitor the scene and surrounding areas. Only through After-Action Reviews following an incident, training and exercises can gaps be identified and improvement plans developed.

Gaps

- Most staff have been trained to the Hazardous Materials Technician level in accordance with OSHA's Hazardous Waste Operations and Emergency Response standards found in 29 CFR 1910.120(e) and (q) as well as NFPA-472 Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents. Annual hazardous materials refresher training is also completed for staff.
 - Documented participation in emergency response training/exercises is not evident.
 - There is detailed evidence of multi-year training that is tracked through a training spreadsheet. The spreadsheet indicates what classes are offered, location of the class, and who presented the class materials. There is no evidence of a calendar schedule or evidence of NIMS ICS training. Improvement can be made with the development of a multi-year training and exercise plan.
 - Currently there are four Emergency Response Specialists for daily operations. That number is insufficient for long-duration operations that may continue over days or weeks. Additionally, this staffing level does not allow for a 24-hour shift rotation.
- Historically, HPCS' role in conducting air quality monitoring during emergencies was to provide monitoring only during the initial phase of an incident. If extended air quality monitoring was required, the Responsible Party was expected to assume the responsibility for conducting air quality monitoring and HPCS provided oversight to ensure the operations was conducted to HPCS' satisfaction. During the Second 80's Incident, this practice was undesirable, and HPCS was expected to perform a separate community air monitoring operation.
 - The initial quantity of detection equipment was insufficient for the incident. Some equipment was out of service and others were outdated and in need of replacement. This required HCPC to hire an outside contractor to provide air quality monitoring equipment.
 - The type of monitoring equipment was insufficient for broadcasting real-time chemical readings back to a central location.
 - The equipment being used was incapable of determining the specific chemical required to both determine the level of exposure concentration to the public and to provide useful information to those members of the community affected by the exposure.
 - As the incident progressed, an outside agency was contracted by Harris County to provide the real-time monitoring. During this transition there was a significant gap in time to provide this service. HCPC should be able to begin the area monitoring on a real-time basis until contractors can respond and begin a more detailed detection strategy.

Recommendations

- Although HCPCS maintains a robust Continuity of Operations Plan (COOP), the personnel portion of the plan that discusses EOC manning was not fully implemented

during the Second 80's Incident. This was evidenced by the continuous manning of the EOC by a very small staff that worked for days without relief. The inability to follow their COOP was apparently due to lack of staff. HCPCS was addressing this shortfall at the time of Second 80's Incident, and this gap is expected to be closed in the very near future. Staff has already been identified and the HCOHSEM has been contacted to request training dates. This staff includes the Director, Deputy Director, Operations Manager, Manager-Field Services, Manager – Compliance Services, Training Coordinator. In the Joint Information Center the staff includes: PIO/Assistant PIO, Communications Specialist, Compliance Coordinator - Water and Solid Waste, other staff as appointed.

- Continuous training is helpful but annual response training and exercises are necessary to ensure an efficient and adequate response. Assessing the knowledge and skill though both Functional and Full-Scale exercises needs to be planned and conducted annually. Ensure exercises are documented with an After-Action Review and Improvement Plan. Refer to the Master Training and Exercise Plan under the One-Year Recommendations.
- Detection equipment needs to be updated and specific enough to identify the hazard. This can be accomplished either through the purchase of appropriate equipment and providing training or using an annual contract with a company who can provide the detection levels on an immediate basis when requested. See recommendations for Community Monitoring under the One-Year Recommendations for details on addressing this gap.
- HCPC should be able to begin publishing the area monitoring data on a real-time basis until Federal/State partners or contractors can respond and begin a more detailed detection strategy. See recommendations for Community Monitoring under the One-Year Recommendations for details on addressing this gap.

Resources

Gap

Although chemical detection is part of Pollution Control's response they do so with old and, in some cases, antiquated technology and equipment. There is not a means to provide specific chemical area monitoring with real-time results being sent back to a central location or to provide real-time data to the public. This led to gaps during the emergency response that could be corrected with the appropriate identification of resources. HPCS is currently researching technologies to upgrade their real-time monitoring capabilities, specifically mobile monitoring and beefing up staff. In addition, HPCS has acquired two specific benzene monitors.



Figure 26. EPA Mobile Air Monitoring vehicle.

One-Year Recommendation

A detailed recommendation to address Community Monitoring (Air, Water and Soil) and Sampling Capabilities and Strategies is included in the One Year recommendations. This should be addressed and implemented as soon as practical.

Capabilities

Hazardous materials response requires highly technical equipment used appropriately by trained staff. To get real-time information to the public this equipment needs to be available immediately.

Gaps

- HCPCS did not have the equipment to adequately provide this information. During the Second 80's Incident, the responsible party (ITC) hired an outside contractor. This contractor was able to provide the information that was desired (although not in a real-time format) and available via web-based applications but there were questions of a potential conflict of interest. Additional resources from the Houston Fire Department's Hazardous Materials Response Team, the 6th Civil Support Team, and hazardous materials technicians obtained through the Texas Interagency Fire Mutual Aid System (TIFMAS) were brought in to supplement the HCFMO Hazardous Materials Response Team's capabilities.
- Air-monitoring provides immediate, on-scene data and information that can be actionable much sooner than soil-sampling. EPA Method 5035A, commonly known as Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples, is the method commonly used for the collection and preparation of

solid samples for analysis of volatile organic compounds (VOCs). The Texas Commission on Environmental Quality (TCEQ) Remediation Division requires the use of this method. Based on the above method a delay is consistent with the sampling and analytical process. Samples must be collected, sealed, placed in a chilled container as soon as practicable, and kept chilled by storing on ice in a cool container. All samples for VOCs should be delivered to a laboratory as soon as practicable after sampling. On-scene, analytical instrumentation such as GC/MS would enhance soil sampling screening and provide more expedient results than utilizing a lab process. Samples must still be collected, packaged, and transported for lab analysis to conclude and/or interoperate a result for reporting and enforcement.

- HCPCS maintains a laboratory that could analyze air, water, and soil samples in limited volumes. During an emergency such as the Second 80's Incident at ITC the volume of samples would overwhelm the capabilities of the HCPCS's lab. When using a contracted laboratory facility, all sampling processes are based on priority, equipment, and lab facility capabilities. Air sampling would always be the highest priority followed by water and soil sampling. Incident objectives pertaining to sampling may change based on situation awareness of the incident. Historically, Environmental Sampling and Monitoring Plans have been developed by the Environmental Unit within the Planning Section of Unified Command that provided comprehensive guidance for collecting, preparing, preserving, shipping, tracking field samples, and recording field data. Alternatively, Harris County can engage a local lab for water and soil sampling analysis. Such lab capabilities and facilities will require extensive specialized staffing and equipment.
- According to the Texas Commission on Environmental Quality, there are 41 fixed sites throughout Harris County that provide a variety of air monitoring data (predominantly ozone detection), none of which provides real-time readings to a central location; Harris County Pollution Control has 12 fixed ozone monitors, of which eight are fully operational and one is near-operational. All 12 should be operational by 2020. Although some information could be gleaned from these detectors, they were not ideal or even adequate for a fire involving fuel producing elevated levels of benzene in the air. Ozone is not released during an event but forms in the atmosphere naturally. Ozone production related to an emergency event can only be investigated after the conclusion of the event. A secondary issue with these 41 fixed sites is that some are maintained by the TCEQ, some by Harris County, and others by industry. There were references that some were not functioning properly. With the potential for any of several thousand chemicals to be released at various locations throughout Harris County, developing a strategy to accurately detect, measure, and report finding in real times is a very complex endeavor and well outside the scope of a 45-day gap analysis. It is recommended this issue be studied by relevant Harris County agencies with the plan to develop a discernable path forward to improve capabilities presented to the County Judge.
- HCPCS has been researching building fixed sites that can differentiate Volatile Organic Compounds. Very basic systems can cost upwards of \$250,000. Advanced

models include a Gas Chromatograph that would require maintenance and additional software costs.

- Real-time detection with transmission of results from multiple sites to a central location for public information was not immediately available.
- Temporary, fixed-site, air monitoring that can be utilized over days or weeks was needed and was not immediately available.

Recommendations

- It is recommended that HCPCS upgrade its equipment capabilities for (air, non-potable water and soil) when fiscally able.

HCPCS is researching for solutions to the temporary, fixed site real-time monitoring data. This recommendation is included in the Community Monitoring Group under the One-Year Recommendations.

Facilities

HCPCS has a lab within their facility, but this lab is very limited to detecting levels of VOCs. Samples requiring more specific detailed analysis must be sent out to a contracted lab, which causes delays in obtaining results (in some cases significant delays).

Gap

Although the HCPCS laboratory is functional for day-to-day operations it would be very beneficial to increase its capabilities by improving and updating the equipment in the lab. New and more detailed laboratory equipment would necessitate an increase in staffing, initial training, and annual training to be prepared for events such as the Second 80's Incident. Contracting with outside laboratories to analyze samples is sometimes costly and not always timely. It may be much less expensive to update and improve the current lab equipment and increase staff to provide the most efficient service to Harris County. Multiple options need to be reviewed to determine an effective path forward.

One-Year Recommendation

Harris County Pollution Control should investigate the capabilities and availability of laboratories within Harris County as well as outside. Consider a contract that enables a "head of the line privilege" for Harris County during incidents and emergencies. This is included in the Community Monitoring Strategy recommendation.

Harris County Sheriff's Office

Harris County Precinct 1 Constable's Office

Harris County Precinct 2 Constable's Office

Harris County Precinct 3 Constable's Office

Harris County Precinct 4 Constable's Office

Harris County Precinct 5 Constable's Office

Harris County Precinct 6 Constable's Office

Harris County Precinct 7 Constable's Office

Harris County Precinct 8 Constable's Office

Law Enforcement Engagement (Summary)

Law Enforcement Agencies were provided an opportunity to learn about this Multi-Agency Coordinating Group Gap Analysis and provide input into it. A meeting for these agencies was held on 15 May 2019 at the Harris County Office of Homeland Security and Emergency Management. The following agencies were invited to participate:

- Harris County Sheriff's Office
- Harris County Precinct 1 Constable
- Harris County Precinct 2 Constable
- Harris County Precinct 3 Constable
- Harris County Precinct 4 Constable
- Harris County Precinct 5 Constable
- Harris County Precinct 6 Constable
- Harris County Precinct 7 Constable
- Harris County Precinct 8 Constable

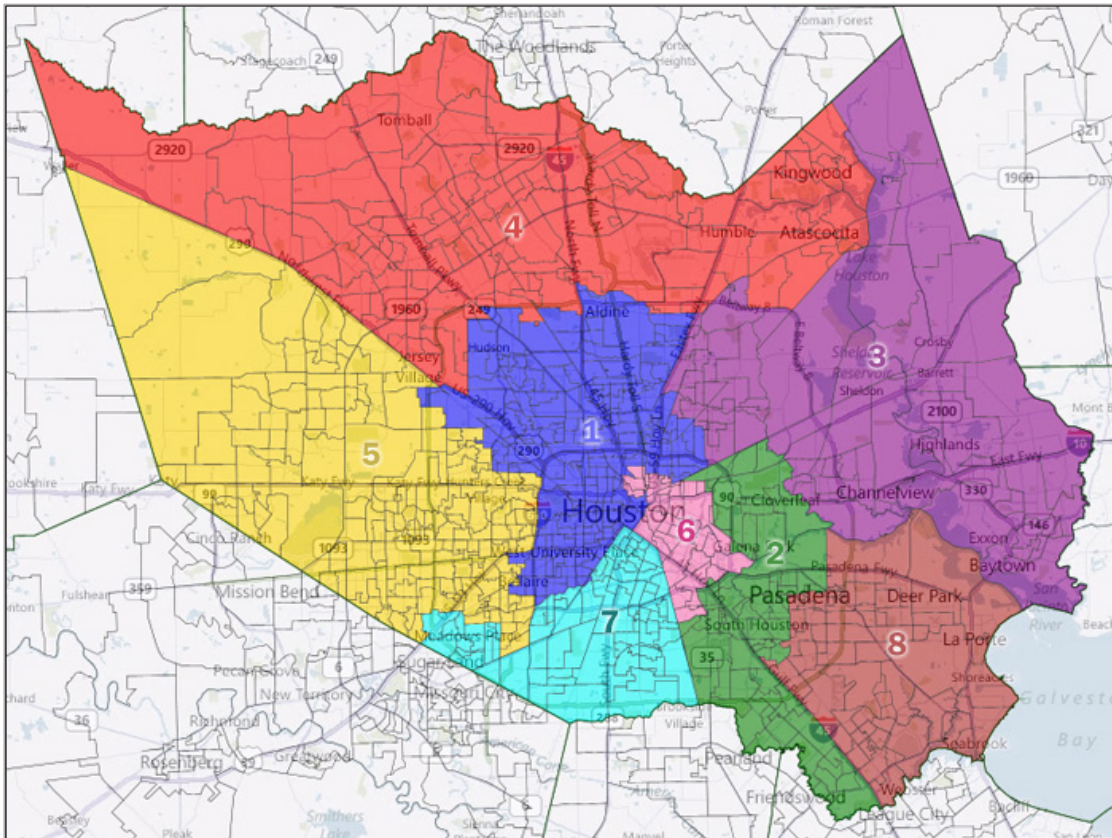


Figure 27. Harris County Constable Precincts

In addition, the Harris County Fire Marshal's Office had a representative present, as did all Harris County Commissioners (one by phone and three in person). Input was received from:

- Harris County Sheriff's Office (Lieutenant J. D. Easthagen)
- Harris County Precinct 1 Constable (Randy Scales)
- Harris County Precinct 3 Constable (Lieutenant Walter Gant)
- Harris County Precinct 4 Constable (Captain Jonathan Zitzmann)
- Harris County Precinct 8 Constable (Sergeant Jennie Jones)



Figure 28. Harris County's Hazardous Materials Response Team operating with Harris County Sheriff's Office at an incident site.

County Law Enforcement Gap Analysis

County law enforcement organizations also received a cursory review as part of this Gap Analysis. It was determined that many are not as familiar with the Harris County Emergency Operations Plan as they should be. The Harris County Office of Homeland Security and Emergency Management should consider scheduling seminar-style exercises to provide an opportunity to enhance the knowledge of law enforcement leaders throughout Harris County. Law enforcement representatives also expressed a need for additional training in both the National Incident Management System and in hazardous materials response, both of which the Harris County Fire Marshal's Office can assist with if properly resourced as outlined in LGC 352.019 and GOV'T § 421.095. Finally, there is

a need for appropriate personal protective equipment for officers in the field; this will have to be jointly addressed by these law enforcement agencies as well as the HCFMO Hazardous Materials Response Team to determine what is needed and whether to issue the equipment, or stockpile the equipment for future contingency use.

Community Stakeholder Action Workshop

A Community Stakeholders meeting was held at the BakerRipley Cleveland Campus Facility in Pasadena on May 31, 2019. This “Community Stakeholder Action Workshop” had 27 participants from a variety of organizations, along with representatives from the County Judge’s Office, each Commissioners’ Precinct, and the Harris County Fire Marshal’s Office. PENTA provided three note takers for the event.

The Director of Community Engagement for Harris County Judge challenged participants in this meeting to remember that the *“Response of scrambling at the last minute does not have to be normal,”* and that the focus of the Action Workshop would be on Prevention, Preparation, and Response and Remediation. Findings from the meeting are as follows:

Prevention

Safety Training: Participants recommended that the County take necessary steps to increase and enhance worker safety and training as it relates to incidents like the Second 80’S incident. Participants encouraged all involved (federal, state, local, and private sector) to support ongoing training needs for all personnel. Participants noted that some entities may need to invest in additional means, either internally or using contractors, to ensure that this training is not only being conducted, but that it is meaningful.

Training is addressed within the Immediate, One-Year, Two-Year, and Three-Year Recommendations.

Collaboration: Participants recommended that the County rely on Local Emergency Planning Committees, Community Advisory Panels, and external organizations to strengthen collaboration and information sharing amongst community members, all levels of government, and industry. In addition, participants stressed that effort needs to be devoted to ensuring that special use facilities, such as schools and health care facilities, are actively engaged in coordination efforts associated with preparedness.

This is included in the Immediate Recommendations.

Legislation and Enforcement: Participants noted that laws should always be enforced equitably, and if there is a lack of regulatory means to ensure that the residents of Harris County are safely protected from hazards, then elected officials should determine the best means to enact legislation that enhances safety.

Recommendations related to this point are included under Immediate and Three-Year Recommendations.

Community Monitoring: Participants recommended that Harris County take an active lead in conducting monitoring activities to ensure the safety of residents. While those attending the workshop recognize that the County currently does not have the resources, many believe it is imperative that the County develop this capability, due to an actual or perceived lack of trust in results provided either by industry or by the contractors of industry. Participants stated that air monitoring should be shared with stakeholders and residents as close to real-time as possible and should be presented in a format that can be understood by the residents of Harris County. This effort may require significant investment from Harris County to ensure the safety of County residents, but those participating in this action workshop felt it was a critical gap that needed to be addressed in short order.

This gap is addressed in detail under the One-Year Recommendations.

Preparation

Safety: Participants stressed that the safety of workers and residents was a critical concern. The Clean Air and Clean Water Acts were discussed, and participants comments on the overall successes/failures leading to the actions during recent incidents.

Risk Management Plans: Participants noted that all persons impacted by an incident, whether workers, responders, or residents, should understand Risk Management Plans. Participants stressed that these plans should be consistent with other RMPs and should be available to the public. Currently, they are not as accessible as desired, and this highlighted a potential lack of transparency.

The County Emergency Managers should be aware of the risk within Harris County and plans should be developed for these individual risks. The EPA should be encouraged to make these plans as available as possible.

Emergency Operations Plan: Some participants were not knowledgeable of the contents of the County Emergency Operations Plan, how often it is updated, or the all-threats/all-hazard nature of the plan. Some did not realize that the plan included Annexes for Communications and Hazardous Materials.

This may provide an opportunity to help educate the residents on capabilities during outreach activities such as Community Advisory Panels.

Community Air Monitoring: Participants recommended that the County develop a real-time air quality reading program to ensure information is being given to the public.

This was also recognized by the Gap Analysis Project Team and was developed into a very detailed recommendation under the One-Year Recommendations.

Response Breakdown: One participant described the Second 80's response as "*not much was successful.*" Although different persons, especially those actively involved in this response may debate the point, few will argue that the County can do better in future responses. Participants further suggested that the County develop and implement a

training and exercise program to address training gaps and employ exercises to validate training, plans, capabilities, resources, and facilities.

This is noted under the One-Year Recommendations.

Public Alert and Warning: Participants noted that the ReadyHarris website was a good start for emergency response information dissemination, but the program lacks a notification process for outgoing messages. Also, many members of the general public are unaware of the program and how to reach people without a technology source.

Recommendations for improving the ReadyHarris website and its content are included in the Immediate and One-Year Recommendations.

Hazard Analysis: Some participants believe that certain businesses are working under the radar (e.g. warehouses) and that they are non-regulated and have little oversight.

The County could commission an in-depth study that explores this potential issue.

Shelter-in-Place/Evacuation: Participants note that most residents do not know how to shelter-in-place or evacuate during a chemical emergency.

This is covered as part of the Immediate Recommendations. In addition, Harris County should engage school districts to help carry the concepts of shelter-in-place and evacuation home.

Understanding: Participants noted that some people living near petrochemical facilities are apathetic to the risks associated with the location – it is important to realize that this apathy exists. It is also important to understand the lack of empathy from county residents not being directly affected compared with those that are impacted.

Personal Protective Equipment: Several participants recommended that the County should provide respiratory protection that protects against air pollutants for all county residents.

This recommendation is not included in the final recommendations section as it was not deemed to be practical or cost-effective.

Unified Command: Several participants suggested the County develop and provide a Unified Command Center to insure a fully equipped facility for all emergencies.

This recommendation is not included in the final recommendations section because the County already has a wide array of mobile command posts and pre-designated facilities identified for this function (see the Central Texas Coastal Area Contingency Plan), all backed up by the Harris County Office of Homeland Security and Emergency Management. Therefore, a new facility is not necessary.

Environmental Awareness: Participants suggested a few ideas related to environmental awareness, including:

- The County could coordinate with schools and employers to develop an air quality program that includes directing children and employees away from fossil fuels to green forms of energy.

- The County could host a county-wide Festival to celebrate the complete environment that exists in Harris County and how to improve the environment. This program would include the planting of more trees, the building of additional parks and green spaces, and the development of a composting program.

Response and Remediation

Response Success: Participants highlighted that the success of response activities in Harris County are related to planning and exercise efforts that are continuously conducted at the federal, state, local, and private sector levels. Part of this effort must be devoted to keeping the residents informed with clear, concise, and accurate information that they can understand. It was noted that both the County Judge's Office and the leadership of the Harris County Office of Homeland Security and Emergency Management were very proactive in working with stakeholders and pushing information out to County residents. Participants stated that effort should continue to be devoted to ensuring that when an incident occurs that there are open communications with industry.

Preplanning: Participants indicated that there was a perceived lack of pre-planning at all levels of government as well as the private sector.

Recommendations to address this are included under Local On Scene Coordinator, Second Industry Liaison, Emergency Operations Plan updates, Common Operational Picture, Duplication of Effort, Interagency Interoperability, and E-Mail Standardization in the Immediate Recommendations and HazMat Team Training Outreach, an Industrial Appendix to the Emergency Operations Plan, and an "Industry 101 Course" for first responders and emergency managers in the One-Year Recommendations.

Dike Wall Failure: Participants noted that the failure of the dike wall during the Second 80's Incident was unexpected, created a series of challenges for responders, and was the critical link failure that resulted in significant amounts of oil and hazardous materials entering the Tucker Bayou and the Houston Ship Channel. Participants recommended that the County employ regulatory authorities and outreach efforts to encourage industry to look at their facilities from an environmental engineering and mitigation standpoint and employ new and emerging technologies to minimize the likelihood of this occurring again.

Lack of Geographic Knowledge: All participants were asked by the PENTA Project Manager, *"Where did the Second 80's Incident at ITC take place?"* Not a single participant recognized that this incident occurred in an unincorporated area of Harris County. Often, there is some confusion as to who is the "Authority Having Jurisdiction," especially when there can be a justifiable claim that more than one agency has jurisdiction (with a prime example being the Upper Houston Ship Channel). Emergency Managers and responders recognize this and continue to take steps to minimize these opportunities for confusion. These are under Interagency Interoperability in the Immediate Recommendations.

Public Alert and Warning: This was a topic of significant discussion and there were multiple comments regarding Public Alert and Warning, including:

- The bilingual press conferences supported by a sign language interpreter were greatly appreciated. Participants noted that the County should study demographics to ensure residents with other languages needs are also being informed in a timely manner.
 - An area that might need some additional attention is the social media aspect of messaging, which could vary in effectiveness from day to day and agency to agency. Recommendations to improve Public Alert and Warning were developed by the Gap Analysis Team and these comments from the Action Workshop participants provided additional reinforcement.
- Participants noted that a variety of factors often contribute to a confusing message that is difficult for the public to understand. Sometimes this is because different agencies and organizations are saying things differently, and other times it is because people are speculating without accurate information. The bottom line is that when this occurs, the residents feel a greater unease at the evolving incident.
 - Comments on how to address this are included in the Immediate and One Year Recommendations (employing and staffing at Joint Information Center built upon the National Response Team model).
 - The County should consider developing pre-approved data sheets about common hazardous materials and provide talking points for elected officials. This could also include details about the air-monitoring process, soil and water sampling process, and response equipment and agencies.

Community Monitoring: While most discussion focused on the need for increased, enhanced, and improved air monitoring capabilities, the participants also noted the need for increased capabilities for water sampling and soil sampling.

This was also recognized by the Gap Analysis Project Team and was developed into a very detailed recommendation under the One-Year Recommendations.

Bias for Action: Participants recognized that there are a significant number of first responders as well as residents with a bias for action. The concept of “Neighbors helping Neighbors” is very strong in Harris County. With that said, a hazardous materials incident does pose challenges, even to the most knowledgeable responder or resident. Elected leaders, emergency responder, and emergency managers must bear this in mind when communicating with and directing residents during an incident.

Local Emergency Planning Committees: Two major issues relating to the efforts of Local Emergency Planning Committees came up:

- Participants noted that there are 14 LEPCs within Harris County, which is more than some states. Quite often, there is not active communications between these various committees. Perhaps encouraging some to merge their efforts, especially those that are not very active, would streamline communications.
 - This is discussed under the One-Year Recommendations.

- Participants stressed that emergency managers/responders and the public should have greater access to Tier II reports.

Centralize and Share Existing Data

The County should explore how to use technology and existing data in order to complement the investments outlined above and proactively share information with the public in accessible formats.

The activities below represent a draft plan that was developed by County stakeholders and was informed by the Community Engagement Workshop. It is important to note that the County would likely encounter many barriers (ranging from data access, to legal challenges, to technical issues) in carrying out the steps below. While not all of the barriers may be surmountable, the County would likely be able to overcome many obstacles and make this plan a reality with dedicated time, personnel and resources. The Pollution Control Services Department could be the lead department for this work and should be consulted for the resources needed to carry it out. They would need to work closely with other departments, including the Fire Marshal's Office and Public Health.

Step 1: Centralize existing monitoring data and make it available to the public in a single location

- To the greatest extent possible, create an inventory of all fixed and mobile air monitoring activity that is already being conducted by various entities (TCEQ, Harris County, City of Houston, universities, non-profits, etc.) across Harris County. This would entail researching publicly available information and conducting direct outreach (possibly through a survey)
 - Identify how the data from the monitoring activities above is currently being shared (either between entities or with the general public)
 - Determine whether the data can be shared directly with Harris County and if the data meets appropriate methods and QA/QC specifications.
 - This would likely require the execution of MOUs with multiple entities
- Develop a geo-coded map that could display, on a single platform, real-time data that is *already being collected* across Harris County. The process to pull data from various sources would need to be automated, which could have network security concerns. There would also need to be an option to add layers and additional data points to the map during emergency events as new data will become available during these times.
 - This map could be hosted on Pollution Control Service's Website and potentially also on readyharris.gov. The map would only include data that meets appropriate methods and QA/QC specifications.

Step 2: Create an easy-to-understand reference guide for the most important pollutants

- Identify the top 15-20 most important pollutants that are being monitored across Harris County
 - The County could define “important pollutants” in a few different ways. It could look at the permits from major facilities and focus on the pollutants that those facilities contain, it could focus on the pollutants that are most dangerous to physical health, etc.
- Develop an easy-to-understand reference guide that includes 1-page fact sheets on each of the top 15-20 pollutants (in English and Spanish at least)
- To the extent possible, standardize definitions and measurements of pollutants
- In collaboration with the Harris County Fire Marshal’s Office, Harris County Public Health Department, and other relevant County departments, define the specific standard(s) that Harris County will use to make critical decisions (e.g. decision to issue a shelter-in-place, make medical services available, etc.) about each of these selected pollutants
 - This reference guide could be hosted on PCS’s website, accompanying the map above so that when people click on a reading, they are brought to a page that explains what they are looking at and whether it is concerning
 - This reference guide could be updated over time to add more pollutants
- For when other pollutants are part of an emergency situation, a framework should be developed for how the right experts should be convened in the right process should be undertaken to create specific standards to guide potential actions as well as a reference guide

Step 3: Enhance air monitoring capacity in priority areas where gaps exist

- Based on the inventory outlined in Step 1 above, identify key gaps in fixed-site air monitoring capacity in vulnerable areas (e.g. places where a facility hosts a large amount of a specific chemicals and there is no monitoring activity for that chemical occurring within a certain mile radius)
- Recommend the best approach for filling those gaps (e.g. install new fixed monitors, invest in drone monitoring, etc.)

Step 4: Educate community about air monitoring and how to access air monitoring data

- Execute a community engagement strategy to educate residents about air monitoring that is being conducted, the new website, and the resource guide
- Solicit feedback on community concerns and how they could be addressed moving forward

Scenarios

The scenarios presented here are similar in nature to the National Planning Scenarios but at the Harris County level. They have been developed to assist emergency responders and emergency managers in developing training and exercises to support plan validation.

While these scenarios may highlight specific locations, the aim in their development is to enable the general exercise plan to be used anywhere within Harris County.

Scenario	Catastrophic Fire
Author	PENTA
References	Harris County Emergency Operations Plan State of Texas Catastrophic Fire Plan Central Texas Coastal Area Contingency Plan
Overview	Tank fire at a Tank Farm on Highway 3 northeast of Ellington Field. Impacted tank is a 250-foot tank loaded with light Texas Crude. 5-Alarm+ Fire Response with potential impact to nearby infrastructure (road closures, air traffic issues, nearby railroad, water treatment plant, nearby schools) and downwind residents. Concern is possibility of boil over, estimated to occur in 16-20 hours.
Unified Command	Federal—Environmental Protection Agency State—Texas Forest Service or Texas Commission on Environmental Quality Local—Authority Having Jurisdiction Responsible Party—Owner/Operator

Scenario	Hazardous Materials—Liquid Release on Land
Author	PENTA
References	Harris County Emergency Operations Plan Central Texas Coastal Area Contingency Plan National Planning Scenario #6
Overview	During morning school operations, a reported pipeline rupture with a visible liquid release (major liquid release as defined by the EPA) in the rear playground area of the Odom Elementary School at 14701 Henry Road in Houston, Texas.
Unified Command	Federal—Environmental Protection Agency State—Texas Commission on Environmental Quality Local—Authority Having Jurisdiction Responsible Party—Owner/Operator (as appropriate)

Scenario	Hazardous Materials—Liquid Release on Water
Author	PENTA
References	Harris County Emergency Operations Plan Central Texas Coastal Area Contingency Plan National Planning Scenario #6
Overview	Train derailment with multiple tank cars off the Clear Creek bridge into the waterway next to Old Galveston Road. There are multiple reports of a liquid leaking and flowing towards Clear Lake which flows into the Galveston Bay. This is classified as a major release with visible liquid floating downstream towards a densely populated area with high dollar properties and environmentally sensitive wetlands along the affected waterways. Several of the tank cars are marked with red placards displaying the number 1208.
Unified Command	Federal—US Coast Guard State—Texas Commission on Environmental Quality Local—Authority Having Jurisdiction Responsible Party—Owner/Operator (as appropriate)

Scenario	Oil Spill (Land/Water)
Author	PENTA
References	Harris County Emergency Operations Plan Central Texas Coastal Area Contingency Plan USCG Incident Management Handbook
Overview	<p>During afternoon bunkering transfer operations between a bunker barge and a chemical tank ship, a major release of #6 fuel oil has occurred at a terminal on Port Road in Seabrook, Texas.</p> <p>The #6 fuel oil is rapidly spreading within the Bayport Ship Channel and is impacting two nearby vessels and facilities.</p> <p>Due to a westerly wind and an outgoing tide, the release oil is moving towards the container dock area where two container vessels are conducting cargo operations. The Coast Guard has directed that all cargo operations being conducted by vessels within the Bayport Ship Channel be secured immediately. The current trajectory of the oil will take it to the entrance to the Bayport Ship Channel and out into Galveston Bay in 1.5-2 hours.</p> <p>Residents in Shore acres (to the north of the Bayport Ship Channel) and in El Jardin (on the south side of the Bayport Ship Channel) are complaining of a very strong fuel odor and respiratory distress.</p>
Unified Command	Federal—US Coast Guard/Environmental Protection Agency State—Texas General Land Office Local—Authority Having Jurisdiction Responsible Party—Owner/Operator Party of Interest—Port of Houston Authority

Scenario	Hazardous Materials—Air Release
Author	PENTA
References	Harris County Emergency Operations Plan Central Texas Coastal Area Contingency Plan National Planning Scenarios #6 and #8
Overview	Major air release of a Toxic Industrial Chemical from a refinery along the Houston Ship Channel. Incident occurs during the late afternoon around the start of the evening rush hour with a significant downwind impact affecting a large population.
Unified Command	Federal—Environmental Protection Agency State—Texas Commission on Environmental Quality Local—Authority Having Jurisdiction Responsible Party—Owner/Operator (as appropriate)

Scenario	Radiological Dispersal Device
Author	PENTA
References	Harris County Emergency Operations Plan Central Texas Coastal Area Contingency Plan National Response Framework National Planning Scenario #11
Overview	<p>Radiation Dispersal Device (RDD) detonated at the Pasadena Convention Center and Fairgrounds, 7902 Fairmont Parkway during peak attendance at the Pasadena Livestock Show and Rodeo. The Rodeo is one of the largest events held in Harris County.</p> <p>An RDD utilizing a 5000 Ci Cs-137 blood irradiator source is detonated outside the Rodeo Arena. The device was in a delivery truck that was parked between the Stock Pens and Arena. The device was set to go off during one of the premier events during the Rodeo.</p> <p>Approximately 180 fatalities, 270 injuries, 20,000 detectable contaminations. Infrastructure damage within 1,500 feet of incident site. 1 square mile area contaminated.</p>
Unified Command	Federal—Federal Bureau of Investigation Department of Homeland Security State—Department of Public Safety Department of State Health Services Local—Authority Having Jurisdiction

Final Analysis and Recommendations

Final Analysis and Recommendations

The Multi-Agency Coordinating Group Gap Analysis Project Team divided all recommendations into five broad categories based on implementation time and costs.

These include:

- Immediate:** Can be implemented within 45-90 days following submission of the Multi-Agency Coordinating Group Gap Analysis report. These recommendations can be accomplished at little to no cost and at the direction of either the County Judge or select department heads.
- One-Year:** Can be implemented within 90 days - 1 year following submission of the Multi-Agency Coordinating Group Gap Analysis report. These are recommendations that can be accomplished with financial support and buy in of relevant decision makers within Harris County.
- Two-Year:** Can be implemented within 1-2 years following submission of the Multi-Agency Coordinating Group Gap Analysis report. These recommendations will require buy in of relevant decision makers within Harris County and support and may take longer to acquire or implement.
- Three-Year:** Can be implemented within 2-3 years following submission of the Multi-Agency Coordinating Group Gap Analysis report. These are recommendations that will require substantial buy in of relevant decision makers within Harris County and with a significantly higher level of financial support and may take longer to acquire or implement. These recommendations may also require development, modifications, or changes to laws and ordinances applicable to the recommendation.
- Long Term:** Recommendations that will be challenging to achieve in a three-year or less timeline due to finances to procure or develop, recommendations that require substantial changes in existing laws and ordinances, or that may have a variety of political, environmental, or practical challenges to achieve. Recommendations that, due to their nature may also simply take longer than three years to implement would also fall into this category.

Where possible, costs and time factors associated with implementation of the following recommendations and/or options are included within the discussion.

Immediate Recommendations

The following recommendations can be implemented within 90 days and with minimal to no cost to Harris County at the direction of either the County Judge, Precinct Commissioners, the Harris County Sheriff, Precinct Constables, and/or select department heads.

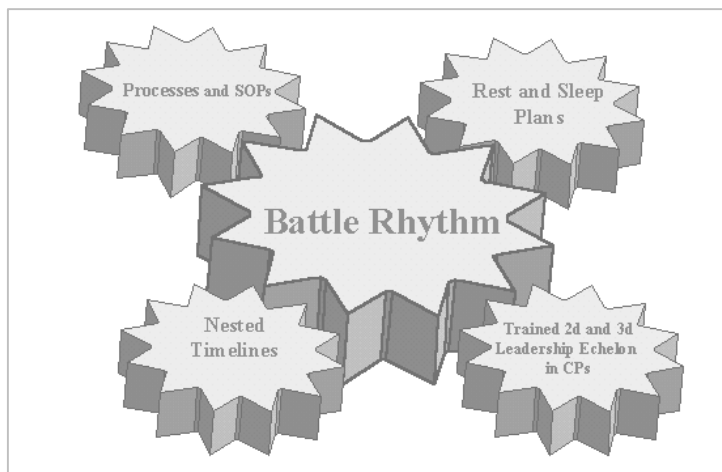


Figure 29. Battle Rhythm

1. Establish and Document a Standardized Battle Rhythm

Recommend completion of the following within the next 3 months:

- Recommend that the Harris County Office of Homeland Security and Emergency Management engage all county departments as well as Commissioners' Precincts, Harris County Sheriff's Office, and Constables' Offices to establish a standard Battle Rhythm for a set Operational Period (for example, 0700-1759 with shift changes at 0659 and 1800). Battle Rhythm should include all EOC-level meetings from the Planning Process, press conferences, stakeholder engagement meetings, and updates to the ICS-209 Operational Status Summary forms and ICS-232 Resources at Risk form. Battle Rhythm should account for outside briefings, such as State of Texas State Operations Center (SOC) or Disaster District Chair (DDC) briefings and other typically scheduled briefings. Battle Rhythm should be published on an ICS-230 Daily meeting Form and shared with all stakeholders. The EOC Manager and/or Planning Section Chief will be responsible for strict adherence to the established Battle Rhythm.
- Time is critical to all persons involved in emergency management and response, and it is the one commodity no one can effectively control. With that in mind, all persons must be cognizant of meeting start and finish times, as well as the agenda of items that will be conducted during meetings. Punctuality is a mark of professionalism, and all persons should be aware and sensitive to the time.
- There is no cost envisioned with establishing and documenting a standardized Battle Rhythm. An example is shown here:

Incident Name NAME		Operational Period From 0700 DDMMYY to 0659 DDMMYY		Daily Meeting Schedule ICS-230-Harris County	
Meeting Schedule					
Date/Time	Meeting Name	Purpose	Attendees	Location	
0000-0100	Mid-Rats	Midnight meal.	All personnel		
0500-0530	Press Briefing	PIO updates media on activities.	PIO, others as directed	JIC	
0500-0600	Breakfast	Morning meal.	All personnel		
0530-0600	Operations Briefing / Safety Brief / Day Shift Change	Present IAP and assignments to supervisors/leaders for next shift in operational period.	Oncoming/Offgoing OSCs, SOFRs, OPBDs, DIVS, TFSTs		
0600	Operational Status Summary Update	Update ICS-209	PSC, RESL, SITL, others as directed	Planning Section	
0615-0645	Unified Command Objectives Meeting	Review/identify objectives for next operational period.	Unified Command, PSC, DOCL, others as directed		
0700-0730	State Operations Center Conference Call	Update from State of Texas and interagency coordination.	Unified Command, DOCL, others as directed	Unified Command	
0745-0830	Command and General Staff Meeting	Unified Command gives direction to Command and General Staff including incident objectives and priorities.	Unified Command, Command and General Staff, SITL, DOCL, others as directed		
0455-0900	Section/Staff Meeting	Brief Sections on specific tasking.	Section/Staff spaces.		
1045-1130	Tactics Meeting	Develop/review primary and alternate strategies to meet incident objectives for the next operational period.	OSC, PSC, LCS, SOFR, SITL, RESL, DOCL, others as directed		
1100-1130	Media Availability	Unified Command and PIO update media on activities.	County Judge, EMC, Unified Command Representative, PIO, others as directed	JIC	
1145-1200	Section/Staff Meeting	Brief Sections/Staffs on specific tasking.	Section/Staff spaces.		
1200	Operational Status Summary Update	Update ICS-209	PSC, RESL, SITL, others as directed	Planning Section	
1200-1300	Lunch	Noon meal.	All personnel.		
1330-1400	Weather Briefing	Update on current and forecast weather.	SITL, JIC representative, others as directed.		
1400-1415	JIC Conference Call	Coordination of messaging.	PIO, JIC Manager, others as directed.	JIC	
1415-1500	Planning Meeting	Review status and finalize strategies and assignments to meet incident objectives for the next operational period.	Unified Command, Command and General Staff, SITL, DOCL, others as directed.		
1515-1530	Section/Staff Meeting	Brief Sections/Staffs on specific tasking.	Section/Staff spaces.		
1515-1545	Media Availability	Unified Command and PIO update media on activities.	County Judge, EMC, Unified Command Representative, PIO, others as directed	JIC	
1730-1800	Operations Briefing / Safety Brief / Night Shift Change	Present IAP and assignments to supervisors/leaders for next shift in operational period.	Oncoming/Offgoing OSCs, SOFRs, OPBDs, DIVS, TFSTs		
1800	Operational Status Summary Update	Update ICS-209	PSC, RESL, SITL, others as directed	Planning Section	
1800-1900	Supper	Evening meal.	All personnel		
1900-1930	State Operations Center Conference Call	Update from State of Texas and interagency coordination.	Unified Command, DOCL, others as directed	Unified Command	
2100-2130	Press Briefing	PIO updates media on activities.	PIO, others as directed	JIC	
Prepared by:			Date/Time:		
Daily Meeting Schedule			ICS-230-HC (Rev Jul 2019)		

Figure 30. Example ICS-230 Daily Meeting Schedule and Battle Rhythm.

2. Senior Advisor for Emergency Management

Recommend appointment of a Senior Advisor for Emergency Management for the County Judge's Office. Note: As of June 6, 2019, the County Judge's Office has already moved forward on this recommendation and is currently interviewing prospective employees.

3. Single Points of Failure

Recommend that all County departments take a comprehensive look at their internal decision-making authorities and processes with a goal to discern potential single-points-of-failure, especially those where limited or no reasonable alternatives exist.

- Almost all the agencies studied in this gap analysis seemed to demonstrate an over-reliance on a few select individuals for either decision-making or to ensure organizational success. In some cases, there are no reliable succession plans in place to address capability shortfalls when key leaders are unavailable.
- All departments should report their findings, including shortfalls, and their plan to address these gaps, to the County Judge.

4. EOC Personnel Assignments

Recommend providing all identified personnel with comprehensive details on roles, responsibilities, and expectations to ensure sustainable EOC operations during long-duration incidents and events.

- Harris County should identify county personnel by agency and name with assigned duties in the Emergency Operations Center.
- Each County department with personnel assigned EOC duties should have a minimum of three persons designated and trained to ensure adequate depth for long-term operations.
- These names should be provided to the Harris County Office of Homeland Security and Emergency Management who will maintain the master list and ensure EOC training for all designated personnel.
- Be prepared to train newly assigned personnel as needed.

5. Personal Protective Equipment (PPE)

Recommend that each department, along with all County law enforcement agencies, engage the HCFMO Hazardous Materials Response Team to discern what personal protective equipment is needed, what initial and refresher training is associated with using this equipment, and what needs to be accomplished to properly maintain the personal protective equipment throughout its lifecycle.

- All Departments studied in the gap analysis have varying levels of involvement during a hazardous materials release. All departments must retain some level of capability regarding response.
- Select personnel in each department plus law enforcement patrol officers may require minimal personal protective equipment to safely perform their assigned duties.
- Individual departments can procure the personal protective equipment and either distribute it or stockpile it for future use. While there will be little to no cost associated with engaging the Hazardous Materials Response Team on specific organizational needs, there will likely be significant expenditures to procure, train on, and to maintain the personnel protective equipment throughout its lifecycle and eventual replacement.
- OSHA requires a written respiratory protection program under (OSHA 1910.134(c)). The program must be managed by a suitably trained program administrator and shall be developed and implemented to provide health and safety requirements, training, guidance, use, care and maintenance procedures.

6. Public Alert and Warning

Recommend an alternative means to communicate with individuals that do not “register” or follow social media and/or websites.

- ReadyHarris emergency response information dissemination was done through Everbridge, which is a platform that allows HCOHSEM to update and send notifications directly through the Website to the “registered” individuals.

Recommend the County study demographics to ensure residents with other languages are informed in a timely manner.

- The bilingual news conferences supported by a sign language interpreter were greatly appreciated. An area that might need some additional attention is the social media aspect of messaging, which could vary in effectiveness from day to day and agency to agency.

Recommend developing pre-approved data sheets about common hazardous materials used in the area to provide talking points for elected officials.

7. Training Requirements

Recommend all elected officials and department heads with emergency management duties should register at www.preparingtexas.org and browse the schedule for courses of interest. This is no-cost online training that can be completed at your leisure.

Recommend that the Harris County Fire Marshal’s Office Training Division take the lead in coordinating NIMS ICS and hazardous materials training for law enforcement agencies. Training for law enforcement personnel should meet TCOLE standards for annual training requirements.

Recommend that all members of Commissioners Court, Department Heads, and senior-level decision makers complete the following online courses:

- IS-700.b - An Introduction to the Incident Command System
- IS-100.c - Introduction to the Incident Command System, ICS-100
- IS-800.c - National Response Framework, An Introduction

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8. Local On-Scene Coordinator

Recommend Harris County ensure Unified Command effectiveness by:

- Assigning appropriate personnel to fill roles with a Unified Command/Unified Area Command as described in the National Incident Management System
- Actively participating in the Greater Harris County Local Emergency Planning Committee, other LEPCs as appropriate, the Central Texas Coastal Area Committee, the Houston-Galveston Area Maritime Security Committee, and the Lone Star Harbor Safety Committee,
- Becoming the regional and national champion to ensure relevant federal, state, local, and private sector plans properly delineate the roles and responsibilities of a Local On-Scene Coordinator,
- Ensuring that the role of Local On-Scene Coordinator is effectively defined within the Central Texas Coastal Area Contingency Plan,
- Actively sharing success stories on the role of the Local On-Scene Coordinator to better socialize the role with a wide array of stakeholders,
- Actively participating in federal, state, local, and private sector exercises to further refine and socialize the role of Local On-Scene Coordinator with stakeholders.

9. General Public Monitoring and Assessment for Health Impacts during Emergencies

Recommend that Harris County Public Health review their emergency operations procedures regarding how to determine if an individual was exposed to hazardous chemicals, and, if so, how Public Health will assess and evaluate the individual for additional monitoring or medical assistance.

- As part of this effort, exposure records will need to be maintained and be made available to appropriate medical or legal authorities. Harris County Public Health should discern if they have the resources internally to perform general public health monitoring and assessment following a hazardous materials release, and if those personnel are trained and equipped to do so.
- If training or equipment is not readily available, develop a plan to address these gaps. In the meantime, consider contracting with a capable service provider to address this gap until this capability exists within Harris County

10. Second Industry Liaison

Recommend the Harris County Office of Homeland Security and Emergency Management address staffing shortfalls as soon as practicable to ensure the ability to support and sustain long-duration activations.

- As there is only one person assigned as Industrial Liaison, that makes 24/7 coverage exceptionally challenging. Consider assigning a second person, ideally with extensive industry experience, to provide relief during long-duration incidents and events. This can be done as a secondary duty if there is an appropriately qualified member within the Harris County Office of Homeland Security and Emergency Management staff.
- Ensure other staffing shortfalls are addressed in a timely and appropriate manner based on current and emerging needs.

11. Harris County Response Boat Operators

- Recommend the Harris County Fire Marshal's Office immediately train and have at least six certified response boat operators with the HCFMO to ensure safe boat operations.
- Given the potential risks and impacts associated with marine operations in the region (Hurricanes Harvey, Ike, Rita, Tropical Storm Allison, Memorial Day Floods), Harris County provides a response boat to support HCFMO Hazardous Materials Response Team water-borne operations. This vessel was critical in supporting post-storm response and recovery operations conducted in the wake of Hurricanes Harvey and Ike.

12. Hazardous Materials Foam Engine Specification Development

Recommend that the Harris County Fire Marshal's Office develop comprehensive specifications for a replacement engine that can delivering/flow 2,000-2,500 GPM of foam with a Class B foam concentrate capacity of 750 gallons. Specifications should be developed for an apparatus with a 12-15-year lifecycle and to keep final total cost of procurement under \$1,250,000.

- The Second 80's Incident highlighted that the Harris County Fire Marshal's Office is in desperate need for a new foam engine to replace the 11-year old model that they currently have.

Recommend specifications be finalized for presentation at a future Harris County Commissioners' Court Meeting. If approved, the current Foam Engine should be retained and maintained as a back-up/reserve vehicle.



Figure 31. Foam Engine examples, Los Angeles County (left) and Corpus Christi's Refinery Terminal Fire Corporation (right) illustrate some of the capabilities envisioned in the replacement Foam Engine for Harris County.

13. Duplication of Effort

Recommend senior leadership of Harris County Fire Marshal's Office, Harris County Public Health Department, and Harris County Pollution Control Services Department meet, discuss roles and responsibilities, and see if there are efficiencies to be gained either through better coordinating efforts or through consolidation of select services.

Recommend that this effort be facilitated by someone outside of these three departments (either from another department within the county or an alternative source). Other than the time and effort involved, there is no cost in having this facilitated discussion.

- There seems to be an actual or perceived duplication of effort with regards to roles, responsibilities, and select services (such as emergency response and public alert and warning) of the Harris County Fire Marshal's Office, Harris County Public Health Department, and Harris County Pollution Control Services Department.
- This is **NOT** to be interpreted as a recommendation to eliminate any departments or services, but rather to discern if there are more effective and efficient means to provide these critical services to the residents of Harris County.

14. Harris County Public Health Department Mobile Health Village

Recommend evaluating how to more effectively utilize this Mobile Health Village concept during hazardous materials exposure events, so that it may provide advanced medical screenings and monitoring post exposure when medically necessary based on the information available to the Local Health Authority at the time. This can be accomplished with minimal cost and effort within a 3-month period.

- The "Mobile Health Village" is not designed to provide chemical exposure assessment or gather samples of blood or urine to be analyzed for toxic materials exposures. It may be possible for the Public Health Department to modify this platform to meet these needs in the future, or evaluate other ways to effectively provide this capability to the greatest number of County residents.

15. Common Operational Picture and Information Sharing

Recommend that the County Judge's Office, all four Commissioners' Precincts, Harris County Office of Homeland Security and Emergency Management, the Harris County Fire Marshal's Office, Harris County Public Health Department, Harris County Pollution Control, Harris County Flood Control, Harris County Sheriff's Office, and each of the eight Precinct Constables' Offices be afforded the opportunity to assess the technical capabilities and common operational picture display systems to discern which best meets the current and emerging needs of Harris County. This can be a side-to-side comparison as might be seen in a Homeland Security Exercise and Evaluation Program "game" or through individual presentations.

- One of the most pressing issues during recent events was a perceived inability to develop and share a common operational picture that was usable by responders in the field, emergency managers at Emergency Operations Center and Joint Information Center, and by elected leaders.
- The need to effectively acquire, analyze, and share accurate and timely information is critical for incident and emergency management. It is also critical that key decision makers, such as elected leaders, as well as external stakeholders, such as the media and the general public be apprised of the most current and accurate information available.
- The key is to determine if there is a system that can be used across the spectrum of agencies to share a common operational picture. Once a determination is made a specification can be developed for Harris County Commissioners' Court to consider.

16. Interagency Interoperability

Recommend that all county agencies involved in this report review those activities that can be used to enhance interagency interoperability and begin active involvement with those relevant to their mission and geographic location.

- The four departments analyzed within this report, along with the other nine county law enforcement agencies should all be encouraged to participate in activities and meetings that encourage collaboration and information sharing. The Community Stakeholder Action Workshop encouraged greater collaboration amongst county agencies as federal, state, local, and private sector stakeholders. These include but are not limited to:

- Local Emergency Planning Committees (14 in Harris County)
 - Harris County Firefighters' Association
 - Channel Industries Mutual Aid
 - Community Advisory Panels
 - Pipeline Group meetings
 - Emergency Management Association of Texas
 - Central Texas Coastal Area Committee
 - Houston-Galveston Area Maritime Security Committee
 - East Harris County Manufacturers' Association
 - Annual Hurricane Workshops
- These engagement activities and meetings can be shared on County websites and through face-to-face meetings with our interagency counterparts.

17. Environmental Enforcement

Community Stakeholder Action Workshop participants recommended that the Harris County Pollution Control Services Department and the Precinct 1 Constable Environmental Enforcement Group, be more active in enforcing environmental laws and regulations within their purview.

18. EOC Operations Section Chief

Recommend Harris County first responder agencies (Fire Marshal's Office, Sheriff's Office, Constable Precincts, Public Health Department, Pollution Control Services Department, etc.) discern potential need for an Operations Section Chief within the Emergency Operations Center on an "as needed" basis.

- Recognizing that an Operations Section Chief within an EOC can be a sensitive subject in some emergency management circles, it would be best for those first responder agencies to work with the Office of Homeland Security and Emergency Management in making this determination. Implementing this concept during activations will most likely be met with departmental overtime costs (with potential reimbursement from federal sources based on the nature of the incident).
- The kind of incident will dictate which department provides the Operations Section Chief (Examples: Terrorism – Law Enforcement; Fire – Fire Marshal's Office; Pandemic – Public Health).

One-Year Recommendations

The following recommendations can be implemented within 90 days -1 year of receipt of the Multi-Agency Coordinating Group Gap Analysis. These are recommendations that will need additional time to implement and can be accomplished with financial support and buy in of relevant decision makers within Harris County:

1. HCFMO Hazardous Materials Response Team Staffing Requirements

Recommend hiring and assigning 16 Hazardous Materials Technicians (job description is included earlier in this report) to bring the HCFMO Hazardous Materials Response Team up to compliance with national standards. This is the most critical response-related gap that needs to be addressed.

- The Harris County Fire Marshal's Office Hazardous Materials Response Team is currently staffed by a company officer and three technicians. The national standard for a Type-1 Hazardous Materials Company is eight personnel. A review of comparable HazMat Response Teams from metro areas throughout the US was conducted as part of this gap analysis. None of these other response teams has the concentration of hazardous materials, transportation networks, and critical infrastructure sectors as found in the Harris County area, yet all have significantly more resources.
- The estimated cost for these new positions is approximately \$1,602,274 for 16 HazMat Technicians and one administrative assistant to support operations. There are two options to implement this plan:
 1. Hire all sixteen Hazardous Materials Technicians (four per shift) and the administrative assistant within the next 18 months.
 2. Recommend hiring eight Hazardous Materials Technicians (two per shift) and the administrative assistant within the next 18 months and a further eight Hazardous Materials Technicians (two per shift) within the next 24 months.

Position	Count	Level	Hourly Rate	Annual Cost each	Annual Cost Total
Admin Assistant	1	Admin IV	\$ 18.91	\$ 66,226	\$ 66,226
HazMat Technician	8	HazMat Tech III	24.96	89,767	718,136
	4	HazMat Tech II	28.11	97,859	391,436
	4	HazMat Tech I	31.52	106,619	426,476
Total Estimated Annual Cost					\$ 1,602,274
Note: Annual costs are fully burdened.					

Figure 32. Harris County Hazardous Materials Response Team personnel needs to meet FEMA's current national standards for a Type-1 Hazardous Materials Response Team.

Recommend that Harris County Commissioners' Court approve the purchase of a replacement Foam Engine as soon as practicable (specifications developed above under the Immediate Recommendation). Delivery of the Foam Engine should ideally be within 18 months or as soon as practical.

- ### 3. HCFMO Hazardous Materials Response Team Geographic Coverage

Recommend placing a quick response vehicle on the west side of the county, co-located at an already existing fire station capable of providing 24/7 support and that has ready access to major transportation networks.

- This quick response team can use the HazMat Support Vehicle (HM-3) as its response unit. This unit may require some additional support equipment, but costs should be minimal. Implementing this recommendation will significantly lessen the time needed to initiate hazardous materials response activities on the west side of Harris County.
- Suggest implementing this recommendation after the hiring of the first eight additional Hazardous Materials Technicians.
- The HCFMO Hazardous Materials Response Team covers all 1,777 miles of Harris County from its station in Atascocita. While the facility is adequate, it does mean that it may take over an hour to get to an incident site on the west or southwest portions of the county.

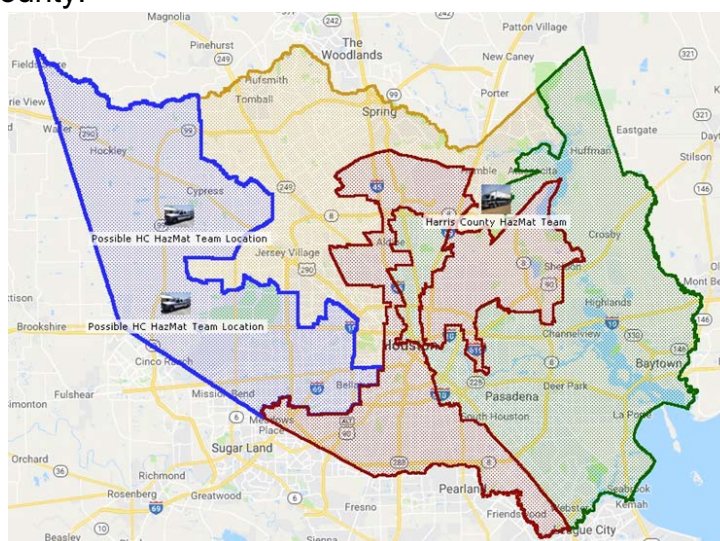


Figure 33. Existing and Proposed HazMat Station Locations

4. Community Monitoring and Sampling Capabilities and Strategies

Recommend Harris County develop a Community Monitoring and Sampling Strategy (Air, Water, Soil and Radiological) and that this strategy be coordinated among the departments who have emergency response responsibilities.

- One of the most visible gaps recognized in the Spring 2019 response operations was the lack of capacity to provide effective community air monitoring and surface water/soil sampling that could provide essential data to key decision makers charged with protecting the health of Harris County residents.
- The HCFMO Hazardous Materials Response Team has a high level of tactical monitoring capability, but they are focused inward towards the emergency. The HazMat team is not staffed to conduct community monitoring.
- Harris County Pollution Control Services is not adequately staffed or equipped to perform the community air monitoring activities that can be critical during an emergency.
- A comprehensive strategy to assess and analyze data and share actionable information in a timely and accurate manner was lacking during the recent emergencies. This was a critical area of concern noted during the Community Stakeholder Action Workshop on May 31, 2019, where participants expressed a strong desire for more to be done to protect the residents of Harris County during emergencies.
- The development of a robust community monitoring initiative will require investments in additional personnel and equipment. Additionally, to ensure that community monitoring happens on an ongoing basis and not just during times of emergency, the County should begin collecting and sharing data that already exists.

5. Public Information and Warning Systems

Recommend Harris County standardize all department's websites with an emergency nexus. This will make navigation easier and familiar for the residents of Harris County who are the principle audience for this information. Accomplishing this will present a unified and coordinated look for the public and instill credibility of the departments and confidence in the eye of the public.

- Standardization of website format will help make the navigation of the site quick, easy, and familiar for use during emergencies. Ease of navigation of county websites was the area that generated the greatest number of comments for improvement from the departments that were engaged as part of this gap analysis as well as in the Community Stakeholder Action Workshop.

Recommend adjusting the ReadyHarris website to ensure that it serves as the main public information page for Harris County emergencies. It must have links to each of the County's websites, must be easy to find and must have easy-to-follow details for residents

on how to shelter-in-place or evacuate during a hazardous materials release. The Social Media Coordinators should regularly adjust the page so that when a member of the public makes a search, ReadyHarris is the top page.

- ReadyHarris should be visually appealing; the page should have a dynamic look as a “hook” that captures and maintains the attention of the public. It needs to be easy to navigate and easy to use with large, obvious choices to link pages that must be checked daily to ensure functionality. ReadyHarris should be user friendly so that there is no loss of appearance (Example; on devices such as cell phones and tablets).
- ReadyHarris should be updated daily during non-emergency conditions and at least every two hours during emergencies. All county offices and departments public notifications, updates, and news releases must be linked to and automatically update ReadyHarris.
- ReadyHarris should be marketed to the public and media as the go-to resource for the most current and up-to-date information. If marketed and managed properly, the page will quickly become trusted by the public and the primary source of information. The public likes being able to quickly go to a site and find the information they need. During emergencies, this page should be linked to the Joint Information Center so all news release, media notifications and public service announcements will automatically be posted to ReadyHarris.
- The page should include critical information that residents can use if needed during an emergency, including how to Shelter-in-Place and how to evacuate during a hazardous materials release. This information should be in all languages and include a list of what materials are needed to shelter-in-place in one’s home or place of business. LEPCs, Community Advisory Panels, and schools should encourage their members to visit these sites and share them with neighbors.
- Establish the ReadyHarris website as the single electronic Harris County Public Notification System. Each Harris County Public Information Officer and Social Media Coordinator should have the ability and authority to independently post/upload a public notification to ReadyHarris. This will ensure that it is easy to find, has an easy sign-up process. The public should be able to select which county departments which they would like to receive notifications. Each notification should be linked to additional information available from the appropriate Harris County department websites.
- Encourage all departments to use the National Response Team Joint Information Center Model. HCOHSEM has been using this model since 2008. This ensures assigned personnel are trained using current methodologies, job aides, and technologies. Details about the NRT JIC model can be found at <https://www.nrt.org/Main/Resources.aspx?ResourceType=PublicInformationandResourceSection=2>.

Recommend Harris County maintain the current Emergency Notification System (ENS) that is managed by Greater Harris County 9-1-1. This is currently the only system capable of implementing a reverse 9-1-1 notification to landlines, which is critical for

residents who still rely on landlines for communications and notifications. Incident Commanders can also use this capability when needed, with a reach of approximately 10,000 landlines. Any attempt by Harris County to duplicate this system would be very costly due to the requirement to purchase telephone numbers from service providers. There are minimal costs envisioned with maintaining the current ENS system.

6. Harris County Public Health Emergency Operations Plan

Recommend the Harris County Public Health Department update their 2018 Emergency Operations Plan. The current plan does not clearly define the department's roles and responsibilities during hazardous materials incidents. It needs a stronger focus on roles, responsibilities, and unity of effort for a chemical response.

- If the decision is made to include Air Monitoring into the departments scope of practice, HCPH will need to incorporate information about its role in the community air monitoring plan and strategy. This will need to have clearly identifiable and executable processes to initiate activation.
- HCPH should support HCPCS in leading the creation of the Community Air Monitoring Plan/Strategy further outlined in the 1-year recommendations section of this report.

7. Harris County Public Information Sharing Capabilities

Recommend creation of a Social Media Coordinator in each department (HCOHSEM, HCFMO, HCPH, HCPCS) to enhance communications with all stakeholders.

- When the Harris County Emergency Operations Center is activated, Social Media Coordinators must report to the Joint Information Center (JIC) to coordinate messaging efforts and work for the designated JIC Public Information Officer.
- Social Media Coordinators will be responsible for social media activities, website management, repair, corrections, updating site, data mining, assistance with rumor control, etc.
- Social Media Coordinators will be empowered to respond to public inquiries using approved Public Information Officer talking points.

8. Master Training and Exercise Program (MTEP)

Recommend Harris County develop and implement a county-wide, interagency Master Training and Exercise Program to address noted training gaps, facilitate improvement planning, and to conduct exercises that can effectively validate plans, training and competencies, resources, capabilities, and facilities.

- Using a multi-year approach (3-5 years is typical) and the exercise outlines provided as part of this Multi-Agency Coordinating Group Gap Analysis should simplify the process.
- An effective program of this nature, like that managed by the Joint Training and Exercise Subcommittee of the Central Texas Coastal Area Committee from 1996-2012, could significantly enhance interagency interoperability.
- Development of this program should involve minimal cost and effort on the part of participating agencies.

9. HCFMO Emergency Operations Division Personnel Resource Needs

Recommend hiring a Captain with the appropriate knowledge, skills, and abilities to serve as the Operations Officer-Emergency Operations.

- The Harris County Fire Marshal's Office is not currently staffed to meet current and emerging needs. The Assistant Chief-Emergency Operations is currently functioning as a de-facto Chief of Staff and Chief Financial Officer for the Fire Marshal and has no deputy to assist with the management of the Emergency Operations Division.
- Annual cost for this is estimated to be \$130,536.68 (this includes base salary, benefits calculated at 39.5% of base salary, and uniforms/structural firefighter protective ensemble).

10. Training Recommendations

Recommend all members of the Commissioners Court, Department Heads, and senior-level decision makers complete the following online courses:

- IS-42 - Social Media in Emergency Management
- IS-230.d - Fundamentals in Emergency Management
- IS-200.c - Basic Incident Command for Initial Response
- IS-547.a - Introduction to Continuity of Operations
- IS-775 - EOC Management and Operations
- IS-908 - Emergency Management for Senior Officials
- These courses are no-cost online training that can be completed at your leisure.

11. Hazardous Materials Training and Capabilities Recommendation

Recommend that the Harris County Fire Marshal's Office review the current training plan over next three months and consider incorporating additional advanced or specialized training into the annual training plan.

- Harris County is the only area in the nation with all 16 critical infrastructure sectors. Every mode of transportation is used for the movement of bulk hazardous materials. Changing threats, technology, and operational requirements, create a need for annual

advanced or specialized training for HCFMO and County law enforcement personnel. Examples include tank truck specialist, intermodal container specialist, marine tank vessel specialist, marine firefighting for land-based firefighters, and specialized Weapons of Mass Destruction training. This training is available thru the Center for Domestic Preparedness (CDP), the Texas Engineering Extension Service (TEEX), and a variety of other public and private sector providers. Some courses require an enrollment fee and others are free.

12. Expanded HazMat Training Outreach Recommendations

Recommend the Harris County Fire Marshal's Office expand its Hazardous Materials Outreach Training Program.

- There are 54 fire departments in Harris County. The HCFMO Hazardous Materials Response Team provides response services to most of these agencies. At times, the HCFMO Hazardous Materials Response Team needs trained and qualified support personnel from these departments, law enforcement agencies, as well as and other agencies who play a key role in providing support to the HCFMO Hazardous Materials Response Team at incidents. Many of these departments have received advanced HazMat training from the HCFMO. Past experience has shown that individuals who have received this training have been invaluable in supporting the HCFMO Hazardous Materials Response Team at major incidents. Expanding the existing training outreach programs will continue to enhance the first responder capabilities and resources for their jurisdictions.

Recommend Harris County Fire Marshal's Office be funded to support three Annual Open Enrollment Hazardous Materials Response Technician training programs each year.

- This will increase regional capabilities and provide additional support during major hazardous materials incidents. This will ensure the long-term continuity of the Hazardous Materials Response Team program.
- Currently one Annual Open Enrollment Program is provided, however it does not provide enough personnel to meet the increasing County-wide operational needs and requirements.
- A 32-person class with 100 student contact hours costs approximately \$20,000. These two additional classes can be conducted for \$40,000 in additional funding to the Harris County Fire Marshal's Office.

Recommend HCFMO work with County Law Enforcement agencies, local fire departments and other agencies to deploy Hazardous Materials First Responder-Awareness and First Responder-Operations level training (initial and refresher) that would be available to all first responders in Harris County.

- Ensure training meets appropriate standards for law enforcement, fire service, EMS to enable them to get appropriate credit for training. Where appropriate, assist these

agencies in determining appropriate levels of training as well as methods to best track training and currency of personnel. Include these training opportunities on the Master Training and Exercise Plan.

Recommend HCFMO develop an expanded distance-learning program and training software for multi-jurisdictional agency training and learning capabilities.

- This would allow emergency responders within the county to take training on-line and at their own pace.
- Establish a Joint Training Team to assess training needs and establish a means to implement an effective distance learning program. A reasonable goal would be to deploy one new course each quarter using currently available resources.

13. Unmanned Aircraft Systems (UAS)

Recommend the HCFMO Hazardous Materials Response Team leverage available and emerging technology for emergency reconnaissance and situational awareness by expanding the utilization of available Unmanned Aircraft Systems (UAS) as incident reconnaissance platforms.

- The HCFMO has a plan in place to fund and deploy UAS assets. This should be leveraged so that future technology such as atmospheric air monitoring can be added to potentially provide real-time air monitoring results and inform the public and key stakeholders.
- *NFPA 2400: Standard for Small Unmanned Aircraft Systems Used for Public Safety Operations* details the minimum requirements for the safe operation, deployment, and implementation of UAS including organization program criteria and considerations, professional qualifications for safety personnel, and elements of a maintenance program. With a funding plan already in place, the only expense for implementing this recommendation is related to training of Drone Operators as well as hardware and software updates as they become available.



Figure 34. Unmanned Aerial System and support unit.

14. Update Tier 2 Data

Recommend Harris County update the Tier 2 reporting data. There are three viable options:

- Option 1: Update the Atlas dataset with the corrected 2017 Tier 2 reporting data completed as part of this project by PENTA. Provide this corrected data to the Harris County Fire Marshal's Office to be utilized for response and planning activities and on-scene modeling support.
- Option 2: Using the newly available 2018 Tier 2 reporting data, direct the Atlas Mapping System Management Team to correct and update the data and import into the Atlas system. Provide this corrected data to the Harris County Materials Response Team to be utilized for response and planning activities and on-scene modeling support.
- Option 3: Hire a skilled contractor to verify/update/correct Extremely Hazardous Substances (EHS) reporting, Chemical Abstracts Service (CAS) numbers, and chemical names and update the data and import into the Atlas system using the newly available 2018 Tier 2 reporting data. Provide this corrected data to the Harris County Hazardous Materials Response Team to be utilized for response and planning activities and on-scene modeling support. Approximate cost for this option is \$45,000.

Recommend the Harris County Fire Marshal's Office use the Tier 2 data to identify the chemicals on site and initially identify the top 20 facilities that have the largest quantities of the most hazardous chemicals. Conduct site visits of these facilities to gather comprehensive information to complete the hazard analysis including worst case and multiple alternative case scenarios. There are three options to complete this task:

- Option 1: Utilize LEPC members: While this is a function that the Local Emergency Planning Committee is tasked with as part of the EPCRA requirements, LEPC's are not funded, staffed, and equipped to carry out a task of this nature. Typically, LEPCs do not have members that are familiar with this process.
- Option 2: Assign Harris County Fire Marshal's Office inspectors and HazMat Team members to complete the task. It should be noted that these personnel have other responsibilities that would distract them from their normal assigned duties if they were tasked with this mission. An alternative could be to hire additional inspectors and HazMat Team members, but this may prove to be cost prohibitive.
- Option 3: Hire a contractor to complete this function. Using a two-person team, it is estimated that this process can be completed for a single facility in an average of two days for approximately \$10,000 per facility.

Recommend Harris County update the pipeline hazard analysis using the latest pipeline data.

- This hazard analysis was conducted using 2015 Homeland Security Infrastructure Protection (HSIP) program data. There is more recent data available that was not

made available to PENTA, limiting the accuracy of this analysis. There are three options to update this hazard analysis:

- Option 1: Utilize LEPC members: While this is a function that the Local Emergency Planning Committee is tasked with as part of the EPCRA requirements, LEPC's are not funded, staffed, and equipped to carry out a task of this nature. Typically, LEPCs do not have members that are familiar with this process.
- Option 2: Assign Harris County Fire Marshal's Office inspectors and HazMat Team members to complete the task. It should be noted that these personnel have other responsibilities that would distract them from their normal assigned duties if they were tasked with this mission. An alternative could be to hire additional inspectors and HazMat Team members, but this may prove to be cost prohibitive.
- Option 3: Hire a contractor to complete this function. Update the dataset with the most recent pipeline data to generate new analysis and identify potential risk to the public and critical infrastructure in Harris County. Estimated cost for this option is \$30,000.

15. Industrial Appendix for Harris County Emergency Operations Plan

Recommend Harris County develop an Industrial Appendix to the Harris County Emergency Operations Plan to better define roles, responsibilities, and expectations during incidents.

- Ensure this appendix includes input from County departments on their specific agency roles and responsibilities.
- Engage Channel Industries Mutual Aid, the East Harris County Manufacturers' Association, and other similar organizations in this endeavor.
- This can be accomplished at minimal to no cost.

16. Industry 101

Recommend Harris County engage local industry to develop an Industry Terminology Course (Industry-101) to facilitate a better understanding of local industry terminology.

- The Industry-101 course can be presented to County departments that respond to industrial incidents to ensure that they are familiar with the unique terminology used by refineries, chemical plants and other similar manufacturing, shipping and storage facilities.
- Site visits should be conducted in conjunction with classroom training to reinforce knowledge of industry and critical infrastructure.

17. Public Health Personnel Needs

Recommend hiring at least one Occupational Medicine Physician within the Harris County Public Health Department.

- Among other duties, this person or persons should be able to:
 - Recommend training needed for HCPH staff regarding hazardous materials and health assessments.
 - Identify health issues and health screening tools depending on the chemical hazard.
 - Serve as Subject Matter Expert for chemical response plan and operations.
 - Serve as an alternate local public health authority.
 - Serve as an advisor to the Public Health Medical Director for hazardous material related events.

Recommend the hiring of at least one Public Health Physician with expertise in emergency response.

- Among other duties, this person or persons should be able to:
 - Review and advise on chemical, nuclear, radiological, and other hazardous response planning and operations for public health.
 - Recommend and oversee medical response training requirements and activities.
 - Work with medical partners (e.g. Harris Health, Harris County Medical Society, etc.) in collaborations during emergency responses.

Recommend the hiring of at least one planner for chemical, nuclear, radiological response.

- Among other duties, this person or persons can:
 - Evaluate and update current plans to meet the needs of a Public Health response to a chemical or radiological incident affecting Harris County.
 - Identify gaps in response planning for chemical and radiological incidents.
 - Assist in the immediate update of policies, plans, and procedures identified in the gaps of this document.
 - Keep up with the ever-changing federal requirements for public health response for chemical and radiologic efforts.

Recommend the hiring of at least one Medical Reserve Corps (MRC) Planner.

- Among other duties, this person or persons can:
 - Assist HCPH MRC coordinator with chemical, nuclear, radiological response volunteer recruitment and activation
 - Conduct annual trainings to volunteers
 - Assist with credentialing of medical volunteers

Recommend hiring at least one Certified Industrial Hygienist (CIH) with a toxicology background within a 12-month period.

- Among other duties, this person or persons can:
 - Provide detailed information on the chemical, physical, and toxic properties of chemicals involved in an incident,

- Assist in identifying downwind hazards and threatened populations,
- Serve in the Community Monitoring Group as the Environmental Health Technical Specialist discussed under the One-Year Recommendation, and
- Assist the Joint Information Center on the development of critical messaging efforts directed at residents or the news media.
- Recommend hiring at least one Industrial Toxicologist within a 12-month period. Among other duties, this person or persons can:
 - Identify immediate action levels during an emergency event involving a chemical release.
 - Identify health issues and health screening tools depending on the chemical hazard.
 - Serve as an advisor to the Public Health Medical Director for chemical related events that threaten the public's health.
 - Assist as a subject matter expert to the Joint Information Center.

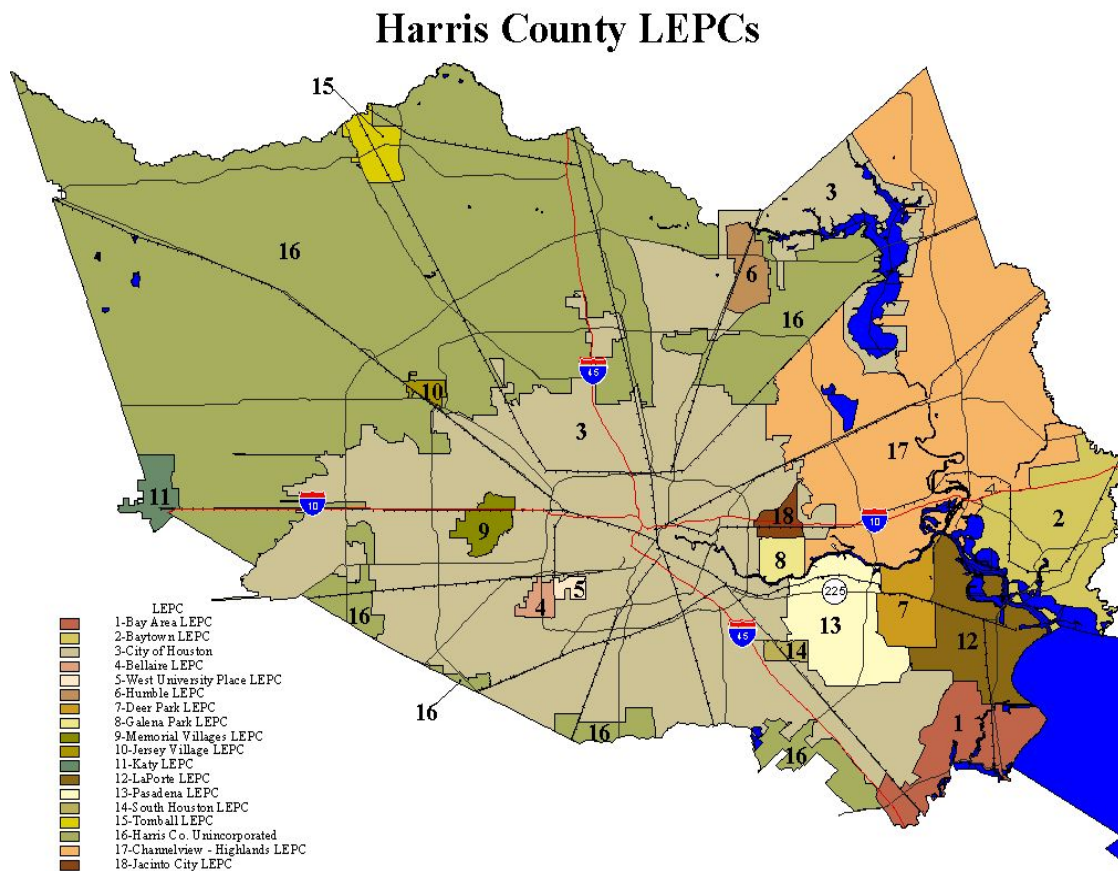


Figure 35. Local Emergency Planning Committees within Harris County.

18. Local Emergency Planning Committees

Recommend the County Judge assess the viability of consolidating Local Emergency Planning Committees (LEPC's) within Harris County.

- There are 14 “active” LEPCs in Harris County. For comparison, the entire State of Florida has nine. Some of the 14 in Harris County are more active than others.
- As the person responsible for appointing the leadership of the LEPCs, the County Judge should encourage those LEPC's that are not active to merge with others.
- Reducing the number of LEPCs in the County to a manageable number (for example, five, with one covering the City of Houston and surrounding communities and the other four strategically located, perhaps one in each Commissioners' Precinct) should reduce overhead, increase membership, enhance communications, and potentially increase participation and activity.
- There should be one County-wide joint LEPC meeting per year with all LEPCs invited. The Community Stakeholder Action Workshop indicated that communications between LEPCs was probably not as effective as it should be, and that consolidation might help this effort.

19. Community Hazardous Materials Protection Plan

Recommend developing a “Community Hazardous Materials Protection Plan” (CHMPP), similar in scope to the existing Community Wildfire Protection Plans (CWPP). Suggest running a beta-test in one active LEPC to ascertain costs and level of effort involved.

- This could be an effective means of engaging the community, local partners, and stakeholders and getting them actively involved in the hazardous materials planning process. Each plan would have four objectives:
 - Identify hazards and risks associated with hazardous materials throughout the county.
 - Identify population centers, critical infrastructure, and other assets needing protection from a hazardous materials release.
 - Prioritize county-wide hazard reduction needs.
 - Engage, educate, and inform the residents about hazardous materials risks and protective measures.

Two-Year Recommendations

These recommendations can be implemented within 1-2 years of receipt of the Multi-Agency Coordinating Group Gap Analysis report. These are recommendations that will require buy in of relevant decision makers within Harris County and can be accomplished with a higher level of financial support and will take longer to acquire or implement.

1. Training Recommendations

Recommend elected officials and appointed department heads with emergency management duties attend the Texas Senior Officials Workshop for All Hazards Preparedness (MGT-312). This course is typically no cost (reimbursement provided) by the State of Texas.

- A course should be scheduled each year in Harris County.
- The Senior Officials Workshop is for local jurisdiction elected and appointed senior officials. Its purpose is to provide a forum to discuss strategic and executive-level issues related to disaster preparedness, share proven strategies and best practices, and enhance coordination among officials responsible for emergency response to a disaster.
- Participants receive an Executive Handbook outlining the emergency management framework (protection, preparedness, response, and recovery phases) as well as other key senior level issues and discussions topics.
- In order to prepare for the MGT-312 it is suggested all members of the Commissioners Court, Department Heads, and senior-level decision makers complete the following online courses:
 - IS-240.b Leadership and Influence
 - IS-241.b Decision Making and Problem Solving
 - IS-242.b Effective Communication
 - IS-324.a Community Hurricane Preparedness
 - These courses are no-cost online training that can be completed at your leisure.

2. HCFMO Personnel Resource Needs

Recommend the Harris County Fire Marshal's Office hire two additional Training Specialists to support the Operational Support Divisions emerging training needs.

- All ten of Harris County's law enforcement agencies indicated a need for hazardous materials training. External regional partners, such as fire departments, public works departments, public health agencies, etc., also require hazardous materials training to meet the requirements of the Occupational Safety and Health Administration (OSHA).

- Instructors should be certified Hazardous Materials Technicians and Hazardous Materials Safety Officers and be available to support the Hazardous Materials Response Team as needed.
- The chart below summarizes the estimated costs of two new Training Specialists.

Position	Count	Level	Hourly Rate	Annual Cost each	Annual Cost Total
Training Specialist	2	Training Specialist - I	\$ 31.52	\$ 136,619	\$ 273,238
Total Estimated Annual Cost					\$ 273,238
<i>Note: Annual costs are fully burdened.</i>					

Figure 36. Proposed Training Positions

Recommend the Harris County Fire Marshal's Office hire two additional Inspectors and one additional Administrative Assistant to address hazardous materials verification of locations, prior inspections, prior fire, law enforcement, or HCFMO response.

- This will enable determination of the highest risk occupancy based on previous incidents to ensure Harris County residents are made safer through inspections, communications with other first responders, and enforcement of required standards.
- The chart below summarizes the estimated costs of two new Inspectors and one Administrative Assistant.

Position	Count	Level	Hourly Rate	Annual Cost each	Annual Cost Total
Admin Assistant	1	Admin IV	\$ 18.91	\$ 66,226	\$ 66,226
	1	Inspector II	28.11	97,859	97,859
	1	Inspector I	31.52	106,619	106,619
Total Estimated Annual Cost					\$ 270,704
<i>Note: Annual costs are fully burdened.</i>					

Figure 37. Proposed Prevention Positions

3. Public Alert and Warning Capabilities

Recommend engaging municipalities within Harris County as well as industry to discern if it is possible to standardize outdoor warning sirens. If this is feasible, this needs to be communicated and coordinated with the LEPC's and community groups to obtain feedback from the residents of Harris County.

- This may be a challenge to achieve across the whole of government and industry within Harris County. Efforts should strive to maximize participation in a standardized system of audible notification.

- If the public alert and warning system feasibility study indicates that voice notification is possible, then multi-lingual issues need to be addressed. The conclusion of the federal government's 2020 Census of Harris County should have sufficient information to determine if Urdu needs to be added to the list of languages. Currently English, Spanish, Mandarin Chinese, and Vietnamese are spoken languages within the county. This was a strong recommendation voiced by several participants in the Community Stakeholder Action Workshop.

4. Tier 2 Access

Recommend county leadership engage state-level officials and legislators to improve access to Tier 2 Chemical Facility reports.

- Emergency Managers and responders, along with participants in the Community Stakeholder Action Workshop agree that there needs to be greater access to these documents, as stipulated in the Emergency Planning and Community Right to Know Act.
- In addition, the TCEQ should be encouraged to update the Dangerous Facility Report (last updated since 2012).

5. Water Supply

Recommend that the water supply system for the Fire Marshal's Office/Sheriff's Office Training Academy meet current water demands and any additional increase in facility utilization.

- The current water system cannot meet the necessary water supply requirements to support the administrative office building with basic drinking and sanitary facilities, as well as the training ground water requirements. Future facility expansion will exacerbate this problem. An engineering company should be contracted to conduct a study to determine the most cost-effective means of increasing the water supply.

Three-Year Recommendations

These Recommendations can be implemented within 2-3 years following submission of the Multi-Agency Coordinating Group Gap Analysis report. These recommendations will require substantial buy in of relevant decision makers within Harris County and can be accomplished with a significantly higher level of financial support and will take longer to acquire or implement. These recommendations may also require development, modification to, or changes to laws and ordinances applicable to the recommendation.

1. Training Recommendations

Recommend all members of the Commissioners Court, Department Heads, and senior-level decision makers complete the following online courses:

- IS-660 Introduction to Public-Private Partnerships
- IS-241.b Decision Making and Problem Solving
- IS-242.b Effective Communication
- These courses are no-cost online training that can be completed at your leisure.

2. Strengthen Containment Walls

Recommend the East Harris County Manufacturers' Association and other appropriate industry groups evaluate methods to strengthen the integrity of dike wall containment systems, with an emphasis on fire protection at industrial facilities.

- New and emerging technology should be assessed to determine what means of protection might be most suitable for the facilities in this region. This recommendation was noted not only by PENTA, but also by several stakeholders during the Community Stakeholder Action Workshop on 31 May 2019.
- While there would be some nominal costs in researching various methods of dike wall protection, the final costs would be borne by the facilities themselves.

3. Harris County Fire Marshal's Office Training Division Facilities

Recommend the Harris County Fire Marshal's Office construct a minimum of two permanently dedicated classrooms, equipped with audio visual equipment, computers and software to facilitate new and additional training requirements.

Recommend HCFMO procure additional training props to support skill-based training.

- This will require the assistance of architectural and engineering firms to determine construction costs, but overall costs for a 50-person classroom are estimated to be approximately \$250,000.

4. Safety Programs and Regulatory Efforts

Recommend Harris County officials actively engage State legislators to consider introducing legislation empowering entities like the Harris County Fire Marshal's Office to be able to survey petrochemical facilities, warehouses, and other facilities that manufacture, process, generate, store, handle, dispense, sell, or use hazardous materials.

- Many of those who participated in this gap analysis, including several participants in the Community Stakeholder Action Workshop, noted a disparity between current safety programs and federal, state, and local regulatory efforts, almost all of which are more reactive than prescriptive.
- Most people involved in this gap analysis agree that limited resources hamper a regulatory agency's ability to enforce regulations. Safety programs overseen by the EPA and OSHA are intended to reduce the frequency and/or severity of hazardous materials incidents.
- Harris County, like other counties within the State of Texas, are often limited by state law as to what regulatory actions they can enforce. Annual safety audits and site surveys of facilities, their plans, and current and emerging conditions can identify and correct hazardous conditions before an incident occurs.

Long Term Recommendations

These are recommendations that will be challenging to achieve in a three-year or less timeline due to finances to procure or develop, recommendations that require substantial changes in existing laws and ordinances, or that may have a variety of political, environmental, or practical challenges to achieve. Recommendations that, due to their nature may also simply take longer than three years to implement would also fall into this category.

1. Harris County Marine Operations Center

Recommend Harris County explore the possibility of constructing a Marine Operations Center in the vicinity of Barbours Cut to provide better operational area access and more effective operational control and coordination, maintenance, and enhanced interagency operability of marine operations.

- Design the center with the expectation that users will include Harris County Sheriff's Office, Houston Police Department, Port of Houston Fire Department, Chambers County Sheriff's Office, Harris County Fire Marshal's Office, and the US Coast Guard.
- Construction of this new center could be funded jointly by the users or through grant monies.



2. Harris County Public Safety Training Auditorium

Recommend the construction of a future Joint Public Safety Training Auditorium that seats 400 to 600 people to be designed for multi-agency utilization and applications.

- This new training auditorium would be utilized by both the Harris County Sheriff's Office and Harris County Fire Marshal's Office as well as by response partners and stakeholders.
- This will require the assistance of architectural and engineering firms to determine construction costs, but it is currently estimated to be in excess of \$2,000,000.



3. Updating Emergency Planning and Community Right to Know Act

Recommend Harris County officials engage local and State Congressional leadership on both sides of the political aisle to craft legislation that will help to make the information from the Emergency Planning and Community Right to Know Act (EPCRA), provided in Tier 2 reports, more useful and accessible to emergency managers and responders as well as to residents seeking to know more about what hazardous chemicals are located near their homes, their schools, and where they work.

- EPCRA, also known as Title III to the Superfund Amendment and Reauthorization Act of 1986, is over 30 years old and needs to be updated to meet the needs of the 21st Century. Although the original legislation in 1986 was drafted in short order, PENTA recognizes that the realities of today's politics will likely require more time to update this federal regulation.



PENTA

CONSORTIUM, LLC

Project Role	Name
Project Manager	Joseph J. Leonard, Jr, MEP, MCP, CEM, CHPP, CPE
Deputy Project Manager	Robert Bradley
Assistant Project Managers	Greg Socks Jason Waterfield
Master Consultants	Timothy P. Butters William T. Hand Mike Hildebrand, CSP, CFPS, CHMM Greg Noll, CSP, CEM Rick Stilp, RN, FPEM, MEP
Senior Consultants	Johanna Abad, MPO Rick Deel Hank DuPont Peter Greco, CSP Ray Meyer, CEM, PCP Kerry Webb, PMP Adam Wine
Consultants	Richard Liliedahl Mary K. Strauss
Business Manager	Linda Socks

